

THE IRON AGE

A Review of the Hardware, Iron, Machinery Trades.

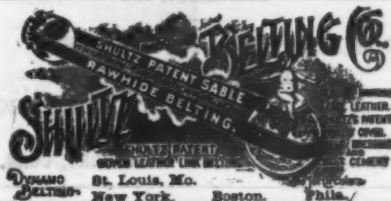
Published every Thursday Morning by David Williams Co., 232-238 William St., New York.

Vol. 73: No. 16.

New York, Thursday, April 21, 1904.

\$5.00 a Year, including Postage.
Single Copies, 15 Cents.

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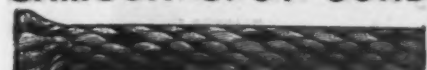
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See Page 25.

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motive Magazine." Second edition. 8vo.
Cloth. 200 pages, 37 illustrations. 10 half-
tone plates. London, 1903.....\$1.00
For sale by David Williams Co., 232 William St., N.Y.

THE IRON AGE

THURSDAY, APRIL 21, 1904.

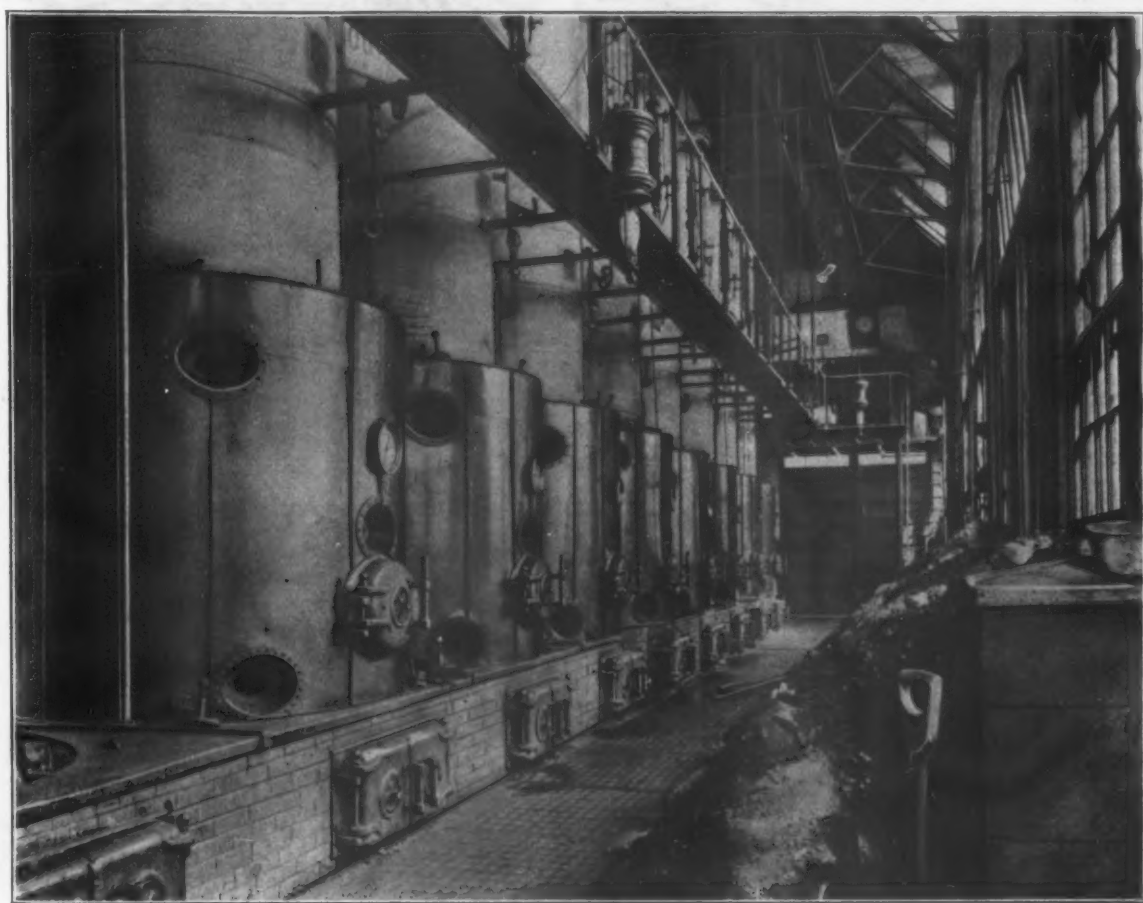
The Yale & Towne Mfg. Company's Power Plant.

One of the Pioneers in the Use of the Steam Turbine.

The power plant of the Yale & Towne Mfg. Company, at Stamford, Conn., will always hold a position of peculiar interest from the fact of its having been the first in this country in which the use of the steam turbine was commercially attempted outside of the works of the builders of the turbine, the Westinghouse Machine Company.

cause of the failure of the vacuum, and other important modifications have been made in the arrangement of certain parts of the plant. These changes were all made before the accompanying photographs were taken, so that they, with the line drawings, show the plant as it exists at present.

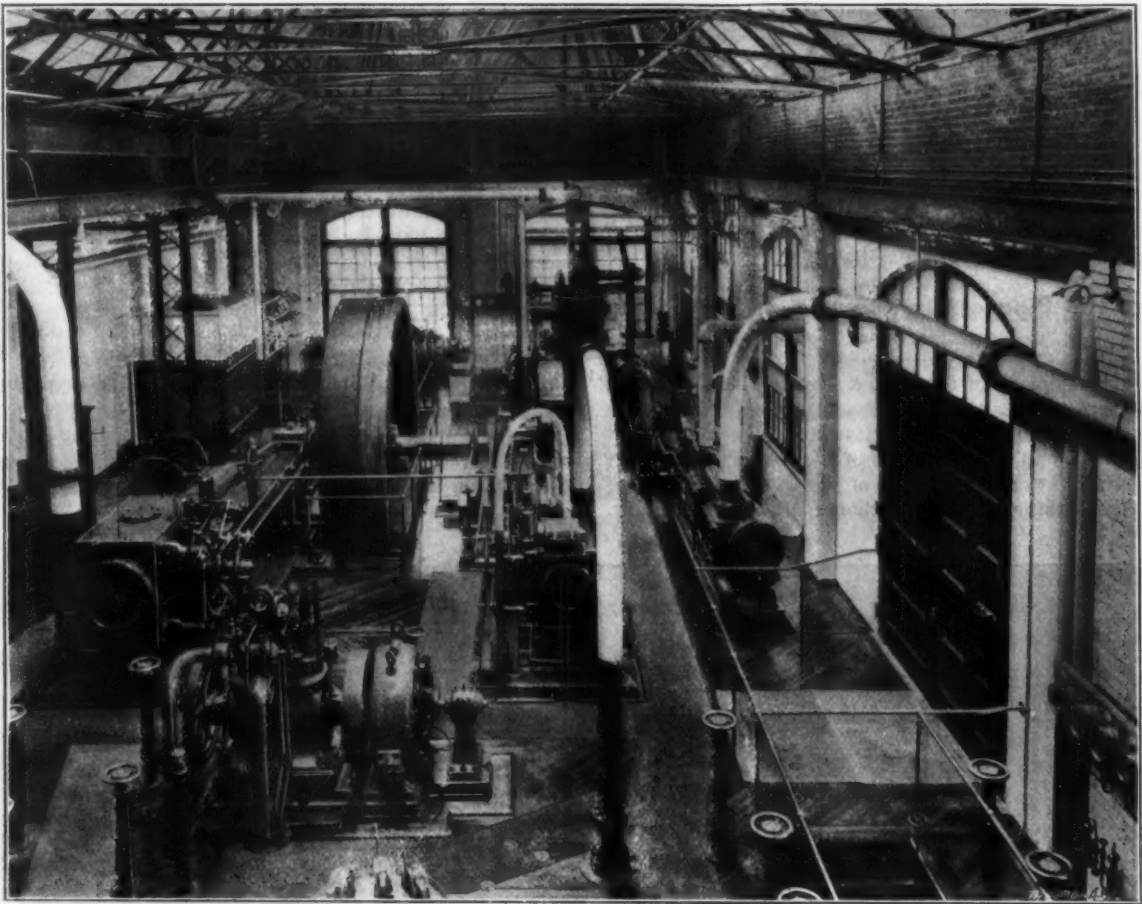
The ground plan gives the best idea of the general layout, showing the relative positions of the boiler and engine rooms and the location of the principal parts. The elevation of the plant taken on the line A B of the ground plan shows the comparative heights of the two buildings. The boiler room has a floor area of 2493 square feet, and the engine room an area of 3348 square feet.



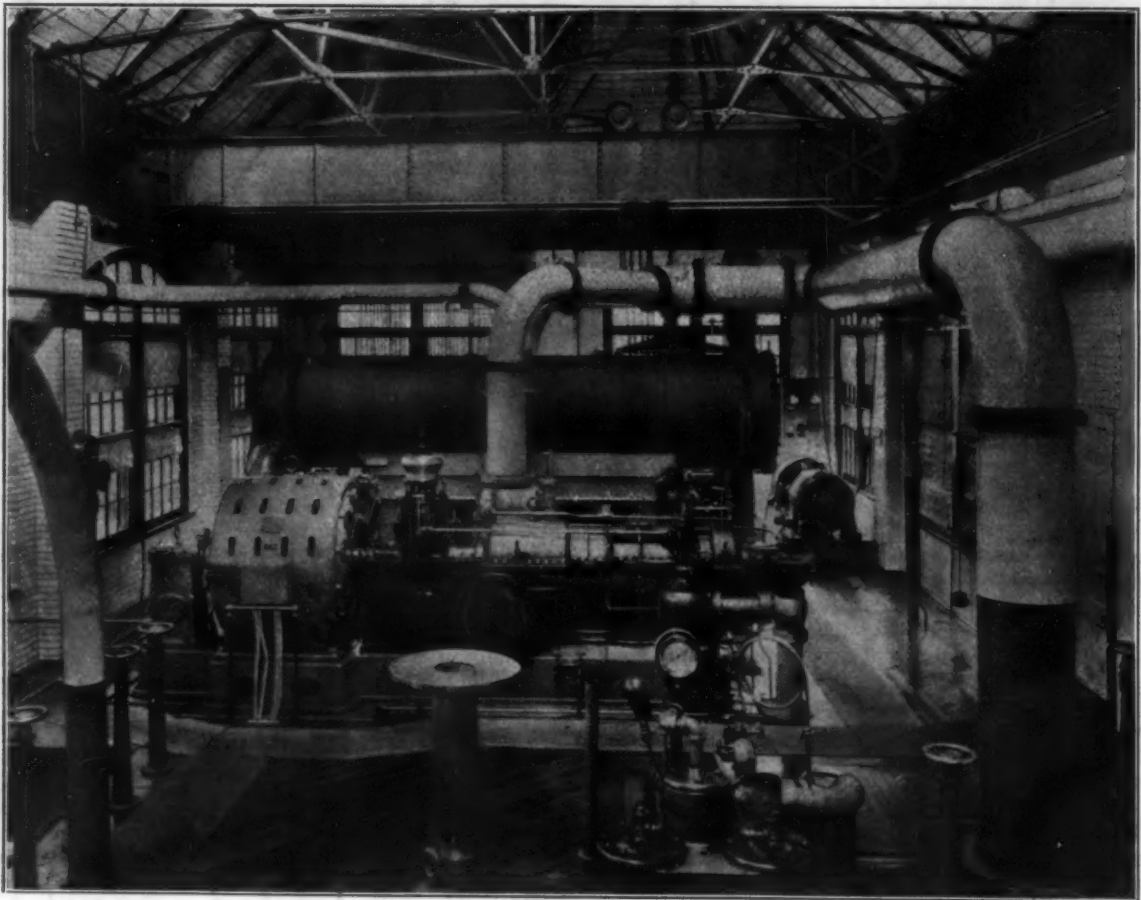
View of the Boiler Room Taken from the South End.

The distinction of being the first such plant in existence did not remain with it for long. The installation of steam turbines was then under consideration by many of the more progressive engineers, and as the time and circumstances were ripe for its more general adoption, others were shortly put in operation. The steam turbine side of this plant was the subject of a most interesting paper read before the American Society of Mechanical Engineers last June during the convening of that body at Saratoga by Frederick A. Waldron, superintendent of the power plant. At that time but one turbine was in position, and since there have been many new developments. The dry vacuum system of condensing the exhaust steam has been substituted for the ordinary form of surface condenser then in use, in which the steam, water and air were removed through the same pump; an improvement in the form of an automatic by-pass has been placed on the turbines which obviates the principal difficulty experienced with the ordinary turbine, the liability of a shut down when running from three-quarters to full load be-

The steam generating equipment includes eight Manning vertical boilers of 135 horse-power each, and provision has been left for the future installation of two more of the same size if it should become necessary. The settings for these are in place, as indicated by the dotted circles on the plan. The boilers were built by the Bigelow Company of New Haven, Conn., and are designed for a maximum steam pressure of 165 pounds. Each boiler has a heating surface of 1388.42 square feet, a superheating surface of 467.56 square feet and a grate surface of 27.27 square feet. The grates are of the Century rocking pattern. In connection with the boiler is a Green economizer containing 144 4-inch tubes, giving a total heating surface of 1728 square feet. Induced draft is provided by a B. F. Sturtevant Company's outfit, consisting of a fan 9 feet in diameter and 4.5 feet wide, driven at an average speed of about 115 revolutions per minute by a direct connected 8 x 10 inch horizontal engine, the steam supply to which is controlled by a Locke regulator. The fan is located near one end of the building, as shown, and dis-



South End of Engine Room.—The small disks in the floor shown in the foreground connect with drip valves for the different systems located under the floor and are operated by detachable keys.

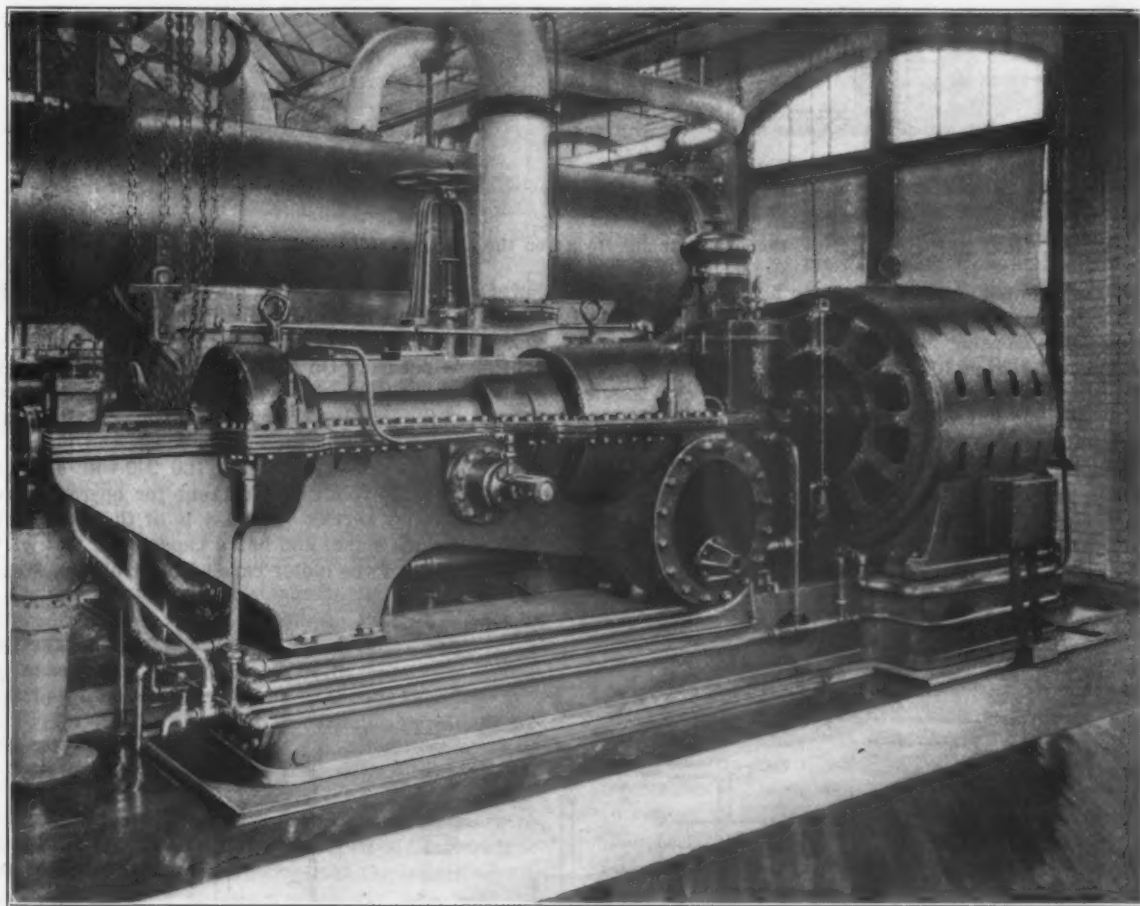


North End of Engine Room.—The standards and hand wheels shown control various valves in the steam piping located under the floor.

charges into the base of the adjacent stack. The flues are so arranged that in case it is desirable the economizer or fan may be by-passed.

From each boiler a 4-inch sweeping bend leads to an 8-inch main running longitudinally of the building back of the boilers. This connects with an 8-inch branch to the engine room, which supplies a Corliss compound engine and the two turbines, and with a 6-inch branch which supplies a bilge pump in the boiler room and an air compressor in the engine room. Near one end of the boiler room there is a 75 horse-power Skinner simple horizontal engine belted to a 50-kw. alternating current generator, which is held as an auxiliary for supplying power and light for overtime work. The remainder of the apparatus in the boiler room includes two underwriters' fire pumps, one an 18 x 10 x 12 inch, built by the Warren Steam Pump Company, and the other a Worthing-

7.5 x 7 inch engine and a 17.5-kw. generator, both of Westinghouse make, running at a speed of 430 revolutions per minute, and delivering current at 140 volts. The alternators are of the revolving field type, and the surface speed of the field is 22,137 feet per minute. Each outfit weighs in the neighborhood of 33,200 pounds, and occupies a floor space 19 x 4.5 feet. The generators are not compounded, consequently the variation in voltage depends within certain limits upon the load and the position of the rheostat. The regulation is very close and satisfactory. All parts of the turbine and generator are lubricated by a forced system, the oil being pumped from a reservoir in the base of the outfit and piped to the bearings and steam chamber. The oil is kept in constant circulation, and is cooled in the reservoir before being pumped back to the machines. The consumption of each machine is about $\frac{1}{2}$ gallon of cylinder oil per week, and



Turbine No. 2 and the Condenser.—The automatic relay is shown in the front and center of the steam end of the turbine.

ton 20 x 11.5 x 10 inch pump, each having a capacity of 1000 gallons per minute; a receiver and Warren high pressure drip pump for draining the condensation from the various high pressure drips and the heating system; a Blake 4 x 4 x 6 inch bilge pump for removing water from the pit; a Berryman feed water heater, 300 horse-power size; a National feed water heater, 150 horse-power size; a hot well, 6 feet in diameter by 5 feet high, and two cross connected Warren 12 x 6 x 12 inch feed pumps, which may be used interchangeably for feeding the boilers. The latter are outside packed bronze plunger pumps of the pot valve type.

In the engine room the two turbines are supplied through 5-inch branches from an 8-inch main under the floor, which connects with the 8-inch branch from the boiler room previously mentioned. The turbines are of the Westinghouse-Parsons type and are direct connected to two-phase 240-volt alternators of 400-kw. capacity (when the turbine is running condensing and the power factor of the alternator is from 90 to 100 per cent.), which deliver current at 7200 alternations per minute when running at 3600 revolutions per minute. The alternators are excited by a direct connected direct current set consisting of a

from 3 to 5 per cent. of the lubricating oil on the bearings may be said to be wasted. It is only necessary to recharge the oil reservoir about once in three months.

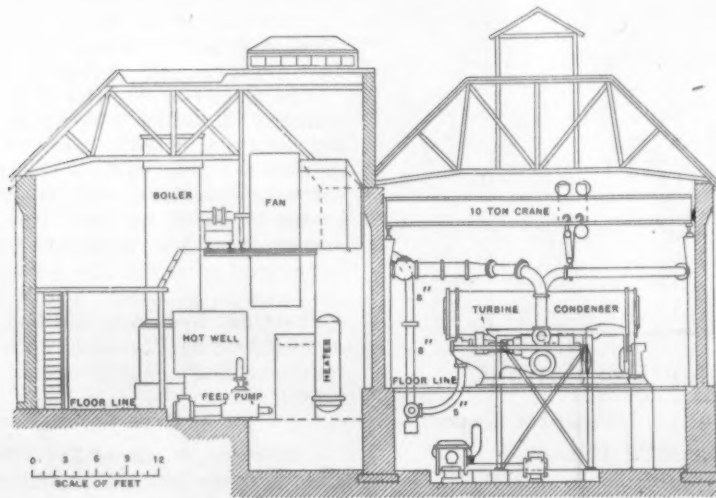
The makers' guarantee for the steam end of the machines was 16.5 pounds of water per electrical horse-power at the switchboard, with 28 inches of vacuum, 40 degrees F. superheat and 155 pounds gauge pressure. The actual conditions existing here are slightly different, the average vacuum being 28 to 29 inches, the superheat 20 degrees F. and the gauge pressure 150 pounds. From recent tests the turbo-generators were found to have a steam consumption of about 15 pounds per hour per electrical horse-power with the conditions as before stated.

Both the turbines exhaust into an Alberger surface condenser located between them. It is 18 feet long by 4 feet in diameter, and contains about 4000 square feet of cooling surface. The water of condensation is drained from the condenser by a 6 x 5.75 x 6 inch Alberger pump located in the pit below the condenser, and is passed to the hot well in the boiler room, from which it is fed to the boilers by the feed pumps. The air is removed by a two-stage air pump, which is capable of maintaining as high a vacuum as 29 inches with both turbines running.

The vacuum pump is of the Alberger make, and consists of two air cylinders each 18 inches in diameter, driven in tandem by an 8 x 24 inch Corliss engine.

The arrangement of the valves and piping of the turbines is such that they may be changed from condensing to noncondensing and *vice versa* while running. In the

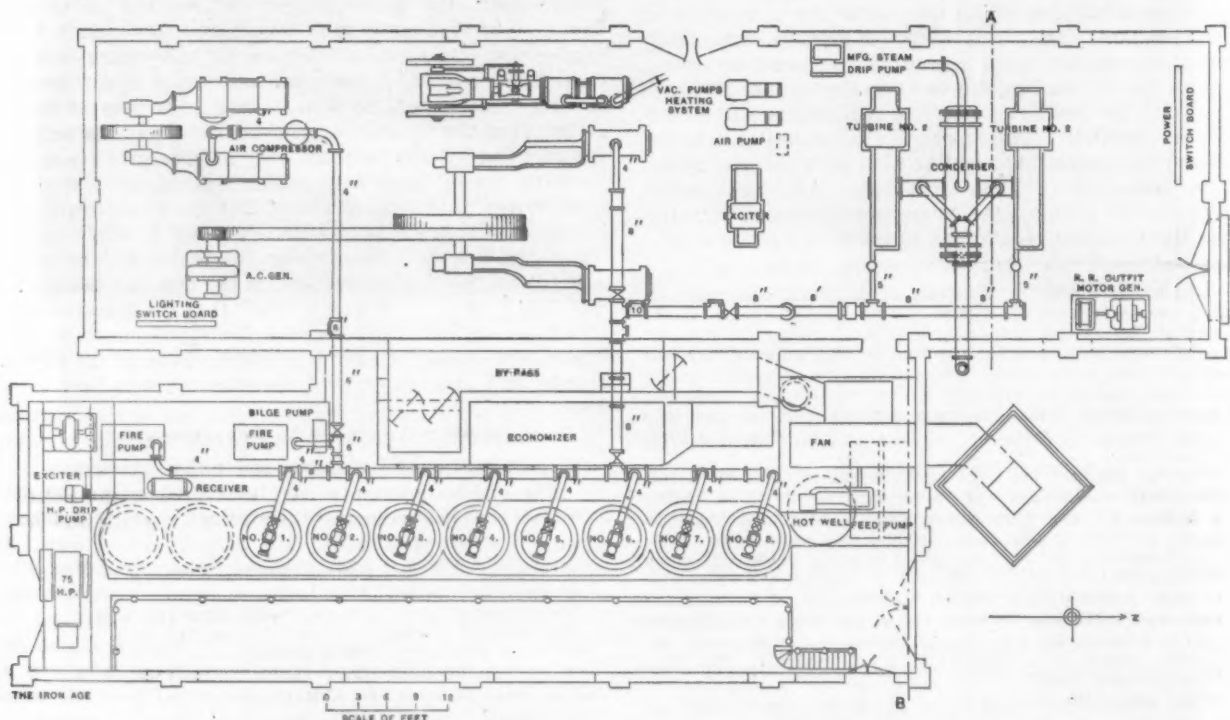
About the center of the power plant is a 300 horsepower cross compound Harris-Corliss engine. The engine has cylinders 12 and 22 x 42 inches and a 16-foot wood rim fly wheel, which is belted to a Westinghouse 120-kw. alternating current generator. This is for lighting purposes, as the turbine equipment is used only for



Elevation of the Boiler and Engine Rooms on the Line A B of Ground Plan.

winter the exhaust steam is used for heating, and it has been the daily custom during the cold season to run the turbine noncondensing from 7 to 10 a.m. and 1 to 3 p.m., and condensing from 10 to 12 a.m. and 3 to 6 p.m. The total load of the plant is within the capacity of a single turbine, so that but one is operated at a time. It has been found that the exhaust from a single one is capable of supplying 25,000 square feet of direct radiating surface distributed about the buildings and 7500 square feet of blower stack surface for the ventilating system, maintaining a temperature of 60 to 70 degrees F. in all the buildings when generating 520 kw., with a temperature

power and such lighting as may be required during the daytime. The engine is run only between 7 and 8 a.m. and 4.30 to 6 p.m., these being the normal periods when lighting is needed. On the left of the lighting generator is shown a switchboard which controls the distributing circuits of the lighting system. The power switchboard is at the opposite end of the engine room, and near it is a motor generator for converting the 240-volt alternating current into 275-volt direct current for operating an interworks trolley service. The set is of the General Electric Company's make, and has a capacity of 25 kw. With the exception of the motor cars of the trolley system, all



Ground Plan of Power Plant, Showing Arrangement and Principal Piping.

of 220 degrees F. in the exhaust chamber of the turbine. To insure the circulation of the steam in the heating system two return pumps are installed in the power house, one of which being used at a time, maintains a suction of 10 inches on the drip ends. These are Knowles 8 x 12 x 12 inch pumps, and are cross connected so that either one or both may be used.

other power consumers are induction motors, and are supplied with alternating current at the generated pressure. All together there are 64 of these motors, ranging in size from 0.5 to 40 horse-power. With the exception of the elevator motors, the entire plant is arranged on the group system of driving.

The air compressor shown at the south end of the

engine room is of the Ingersoll-Sergeant make, 150 horsepower size, and is compounded on both the air and steam ends. The steam cylinders are 16 and 26 inches in diameter, and the air cylinders 22.25 and 14.25 inches in diameter, and the stroke is 18 inches. The air is compressed to 80 pounds per square inch, and is used for manufacturing purposes. The engine room is served by a hand traveling crane having a span of about 20 feet, and equipped with a Yale & Towne 10-ton triplex block, so that facilities are at hand for accomplishing repairs in the shortest time, or to allow any changes in arrangement that may seem desirable, without seriously interfering with the continuous operation of the works. No. 1 machine has run continuously for 14 months, nine and ten hours per day, without a shut down chargeable to the turbine or its generator.

The entire plant was designed and installed under the supervision of Frederick A. Waldron, the superintendent of power and plant and consulting engineer, Stamford, Conn.

Marine Boiler Regulations.

House Committee Makes Favorable Report on Department's Bill.

WASHINGTON, D. C., April 19, 1904.—Congress is making a notable effort to pass at the present session the bill drafted by the Department of Commerce and Labor providing for the amendment of the laws governing the construction and inspection of marine boilers. The measure passed the Senate on the 8th inst., as reported in this correspondence last week, and on the 15th inst. it was reported from the house Committee on the Merchant Marine and Fisheries with a favorable recommendation. Arrangements are being made to bring it up on the floor during the current week, and as the House committee has not seen fit to amend the measure in any respect there will be no occasion for delay in conference between the two houses, and the bill is therefore likely to receive the President's signature within the course of a few days.

House Committee's Report.

In reporting the bill to the House the Committee on the Merchant Marine and Fisheries submits some interesting memoranda with regard to the practical operation of the bill, and especially as to the manner in which authority for modifying existing regulations will be exercised hereafter. The report of the committee contains several statements that will be read with interest by the boiler manufacturers and shipbuilders who have sought to secure the appointment of an expert commission to revise the laws and regulations relating to boiler construction and inspection. In this connection the report says:

The bill is a revision of certain of the steamboat inspection laws, and is in part the outcome of a special session of the Board of Supervising Inspectors held last summer for the purpose of revising those laws. At that session shipping interests generally were represented. The results of this special session have been carefully reviewed by the Supervising Inspector-General of Steam Vessels, from the technical point of view, and by the Deputy Commissioner of Corporations, from the legal point of view.

Various business interests, such as general manufacturing, shipbuilding and shipowning concerns, have united in urging the passage of some such legislation on the ground that the existing laws are cumbersome, inflexible, and unsuited to conditions of modern business, and laid a needless burden on many industries of the country. Though the main features of this bill were prepared last summer by consultation with many diverse and conflicting interests, yet no opposition has appeared to the passage of this bill, but, on the contrary, there has been a general demand by all affected by it as remedying many present conditions of hardship.

The shipbuilders and boiler manufacturers would be very much interested to know what shipping interests are referred to by the committee as having been represented at the special session of the Board of Supervising Inspectors held last summer for the purpose of revising these laws. They would especially be glad to know whether the committee regard the urgent appeal that has been made for the passage of the Commission bill—an entirely different proposition from the pending measure—as a part of the "general demand" for such legislation as that now proposed. This portion of the report is an excellent illus-

tration of the manner in which Congress is frequently misled by carelessly prepared statements of its committees based upon the representations of interested parties.

An Important Change.

The committee calls attention to the change in the statute effected by the bill through the amendments incorporated in Section 12. By this section the very important function of the Board of Supervising Inspectors of examining and approving all new safety appliances is transferred to the Secretary of Commerce and Labor. The report states that this change is made "for obvious reasons of flexibility." New inventions of this sort are being made constantly, it is stated, but as the board meets only once a year, and then only for a few days, great hardship is inflicted upon inventors and manufacturers by the intervening delays in securing approval for new devices. It remains to be seen how this change will work in practical operation. In the past it has been found that the technical knowledge of the Board of Supervising Inspectors has frequently operated to prevent the approval of inefficient devices which have been backed by strong influences that might otherwise have secured official approval.

No Expert Commission Likely.

The correspondent of *The Iron Age* is in a position to state that the Commission bill advocated by the special committee of the American Boiler Manufacturers' Association will receive no further attention at the hands of Congress, at least at the present session, and it is doubtful whether, in view of the probability that the Frye bill will become a law, any serious attempt will be made to pass it next winter. The boiler manufacturers quite generally echo the views expressed by Mr. Fletcher, as quoted in these dispatches last week, to the effect that if Congress will not authorize the revision of the laws and regulations by an expert commission the boiler manufacturers can stand it and will not devote their energies to any further attempts to push legislation in Washington.

It is now regarded as improbable that Congress will create a commission for the sole purpose of revising the regulations under the laws as amended by the Frye bill. This bill repeals nearly all the specifications regarding boiler construction in the present statutes, and leaves all details to be covered by the regulations. As a result, the regulations will hereafter possess an importance which they have never had in the past, and it is a prime necessity that they should be revised with great care as soon as the Frye bill passes, in order that the statutes which are repealed by this measure may at once give place to carefully drawn, up to date official regulations. There is good reason to believe, however, that the Department of Commerce and Labor is now contemplating an early meeting of the Board of Supervising Inspectors for the purpose of revising the regulations, as the new law takes effect July 1 next. It is hardly likely that the Department would be willing to recommend the appointment of an expert commission to make a second revision of the regulations, and this project will therefore have to be abandoned.

Boilers Approved by Department.

The Secretary of Commerce and Labor has approved the following boilers which were submitted to the Board of Supervising Inspectors at their recent meeting and favorably reported upon:

Pipe boiler of J. L. Anderson, Seattle, Wash.
Barton's flash boiler, Chicago, Ill.
Water tube boiler of C. F. Davenport, Brooklyn, N. Y.
Pipe boiler of William F. Duvall, Jersey City, N. J.
Boiler of Keep & Co., Portland, Ore.
Water tube boiler of Harry Lawson, New York, N. Y.
Pipe boiler of U. G. Lee, Chicago, Ill.
Locomotive boiler, Chicago, Ill.
Pipe boiler of James McCartney, Mobile, Ala.
Water tube boiler, by Charles D. Mosher, New York, N. Y.
Pittsburg boiler, by Pearson Mfg. Company, Allegheny, Pa.
Racine water tube boiler, Racine Boat Mfg. Company, Muskegon, Mich.
Boiler of Bladen Iron Works, San Francisco, Cal.
Pipe boiler of Josiah Robinson, Watervliet, N. Y.
Pipe boiler, by Schwing & Graud, Gramercy, La.
Boiler presented by Horace See, New York, N. Y.
Water tube boiler presented by J. A. Shaw, Newark, N. J.
Smith patent boiler presented by E. J. Codd, Baltimore, Md.
The Committee on Boiler Apparatus of the Board of

Supervising Inspectors has made a report with regard to the Hercules spring loaded safety valve submitted by the N. L. Hayden Mfg. Company, Columbus, Ohio, stating that the valve conforms with the requirements of the law, and they therefore recommend its adoption when constructed as shown in blue prints and communications received. The Secretary of Commerce and Labor has approved this recommendation.

W. L. C.

Calcining Limestone for Use in the Basic Open Hearth Furnace.

BY DAVID BAKER, PHILADELPHIA.

Owing to the rapid increase on this continent of the manufacture of open hearth steel, the necessity has arisen for a substitute for steel and wrought iron scrap, which is now greatly enhanced in value by reason of the accelerated demand. On this account attention has been directed to the pig and ore process, and because of the low price of non-Bessemer stock the growth of the basic open hearth has been greater than that of the acid process.

The several different basic open hearth processes now in use are the outcome of the effort to reduce the time of the heats and consequently the cost of manufacture. One important factor in this direction is the use of lime instead of raw stone in the process, and is of especial advantage in the pig and ore process.

To those confronted with the same conditions the experience of the writer at the Dominion Iron & Steel Company's works, Sydney, Nova Scotia, may be valuable.



Fig. 1.—Limestone Calcining Plant at the Works of the Dominion Iron & Steel Company.

At this plant the problem was to furnish 100 to 120 net tons of lime per day, delivered into the charging boxes at the minimum cost. The limestone, a very pure marble, is obtained from the company's quarry on the Brass D'Or lakes, about 65 miles from the works by water. There is no difficulty to get from this deposit stone averaging in cargo lots less than 1 per cent. in silica. For use in the kilns the material is broken by hand so as to pass a 10-inch ring, but on account of the expense of handling this size, experiments are on foot to use the larger sizes of the regular crushed product supplied for the blast furnaces. It is hoped to accomplish this by applying induced draft to the kilns.

In Fig. 1 is shown a general view of the plant. On the right is the hoist tower, where an electrically operated skip bucket elevates the stone from an underground bin supplied by stone from 80,000-pound hopper cars. On top of the kilns the stone is received in a side dump charging car traveling on rails. The fuel used at first was coal averaging 2.25 per cent. in sulphur, but the lime was too high in sulphur for open hearth use. It averaged 0.22 per cent. in sulphur, the outside of the

lumps carrying 1.1 per cent. and the inside 0.10 per cent. of sulphur. The next fuel tried was gas from the Otto-Hoffman coke ovens, which carries 500 grains of sulphur per 100 cubic feet. This gave even higher results in sulphur, and finally tar was adopted containing 0.25 per cent. of sulphur. This gave lime with 0.11 per cent. of sulphur, an amount that gave no trouble in the open hearth process. The sale of the tar to a by-product company made it necessary to go back to other fuel and,

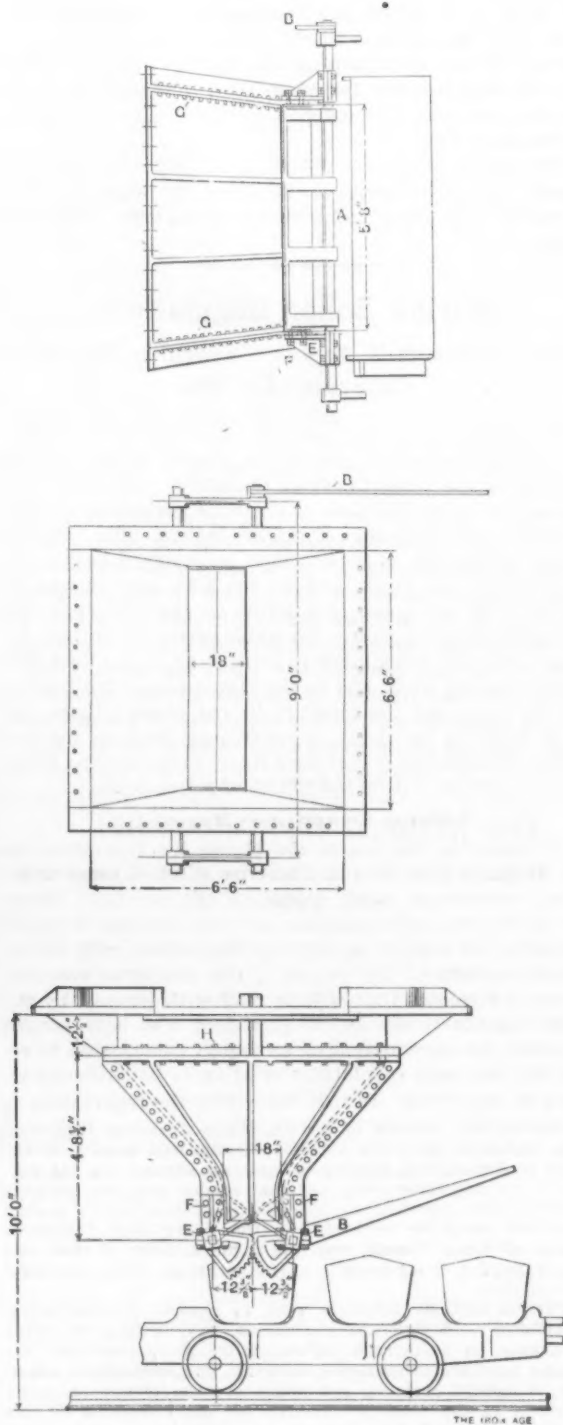


Fig. 2.—Specially Designed Valve for Drawing Limestone Kilns.

therefore, a plant of gas scrubbers using bog ore as the purifying agent is being installed. It is expected, based on laboratory experiments, that by this means 95 per cent. of the sulphur in the gas will be eliminated, forming an ideal fuel for calcining stone.

With gas firing the labor will then be for the maximum production of 120 tons per day as follows: 1 foreman, 2 firemen, 2 top fillers, 2 unloaders, 1 skip hoist engineer and 1 drawer at night, making 9 men the total force employed per 24 hours.

The drawing of the kilns is accomplished by means of a specially designed valve, shown in Fig. 2.

One man by means of the lever B, shown, can draw the lime into the charging box, filling the whole box quickly and evenly and controlling the flow at will. It has been our experience that it is not necessary to completely burn the lime for open hearth use; in fact, the lime works just as well when each lump has a small kernel of raw stone at the center. On this account 1½ tons of stone give 1 ton of lime suitable for open hearth use.

On this basis the labor cost per ton of lime would be as follows at the rates obtaining there: Superintendence, 4 cents; other labor, 12 cents; total labor cost per net ton of lime, 16 cents.

When it was contemplated to use coal as a fuel the Eldred process was decided upon, and the guaranteed fuel consumption placed at 450 pounds per net ton of lime. On this basis for Sydney the fuel per net ton of lime will cost 25 cents.

With tar as fuel we have found that it required 41.74 imperial gallons per net ton of lime, and at 2¼ cents per gallon, the value at the works, the cost is prohibitive.

In the case of gas, however, considering the thermal value of the coal used here as 12,500 British thermal units per pound, a figure found by actual test, then with gas at 550 British thermal units per cubic foot 10,227 cubic feet will be required per net ton of lime, based on the guaranteed coal requirements. This by-product gas is charged to the departments at 4 cents per cubic foot, which compares with Pittsburgh natural gas at 10 cents. On this basis the fuel per net ton of lime would be 40.9 cents, which is considerably higher than coal; but, on the other hand, when purified, is low in sulphur, easy to regulate and requires the minimum labor for the purpose. In order to use this gas about 1 ton of ore will be consumed in the purifiers per day, worth in the scrubbers \$4 per ton, or 4 cents per net ton of lime burned on a basis of 100 tons output. When these are in operation the cost of a ton of lime above the value of the stone will be as follows when fired with gas: Labor, 16 cents; gas, 40.9 cents; scrubbing, 4 cents; total, 60.9 cents, the cost of a net ton of lime above the value of the stone.

The National Eight-Hour Bill.

It is Referred to the Department of Commerce and Labor.

WASHINGTON, D. C., April 16, 1904.—The House Committee on Labor on the 7th inst., upon the conclusion of a series of hearings extending over two months, adopted a resolution referring to the Department of Commerce and Labor the so-called National Eight-Hour bill, with a request for a report, to be presented next December, with regard to the desirability of the measure and its practical effect upon the Government and upon the industries of the country at large. This disposition of the bill, which was foreshadowed in these dispatches a fortnight ago, is most gratifying to the manufacturing and employing interests that have strenuously opposed this legislation and have finally convinced the Labor Committee of the House that no such measure, with its far reaching consequences, should be acted upon without full information from the most authoritative source concerning the price likely to be paid for the arbitrary curtailment of the workday in the private plants of all Government contractor and subcontractors. The resolution as adopted by the House Committee is as follows:

The Text of the Resolution.

Be it resolved by the Committee on Labor of the House of Representatives, That the Secretary of Commerce and Labor be, and he hereby is, requested to investigate and report upon the bill, now pending in said House, numbered 40,064, H. R., entitled "A bill limiting the hours of daily service of laborers and mechanics employed upon work done for the United States, or for any Territory, or for the District of Columbia, and for other purposes," his said report to state his conclusions with regard to the following questions:

1. What would be the additional cost to the United States of the various materials and articles which is customarily procured by contract, which would be governed by the limitations set out in the said bill?
2. What damage, if any, would be done to the manufacturing interests affected by the provisions of the bill, if enacted?
3. Whether manufacturers who have heretofore furnished

materials and articles to the Government under contract would continue to contract with the Government if such contracts were within the peremptory eight-hour limitation provided by the said bill?

4. What would be the effect of the enactment of the said bill upon the shipbuilding industry?

5. What would be the effect of the enactment of the said bill, if any, upon the export trade of the country?

6. Are the laborers of the country, organized and unorganized, who would be affected by the proposed legislation, willing to have taken away from them the right to labor more than eight hours per day, if they desire to do so?

7. What effect will this proposed legislation have, if any, upon the agricultural interests of the country?

A report upon this bill along the lines indicated is respectfully requested at the commencement of the next session of Congress.

The Measure in the Senate.

The adoption of the Vreeland resolution disposes of the bill in the House so far as the present session is concerned, but the same measure is pending before the Senate Committee on Education and Labor, and the most strenuous efforts are being made by the labor leaders, openly assisted by Chairman McComas of the Senate committee, who has become an avowed partisan of the bill in spite of the semi-judicial character of his position as chairman, to have the measure reported and passed by the Senate before adjournment. The hearings before the Senate committee which began early in March were closed on the 6th inst., although the friends and opponents of the measure were given another week in which to file any written statements they might desire to put into the record.

The closing arguments on behalf of the bill were submitted by Messrs. O'Connell, president of the International Association of Machinists, and Samuel Gompers, president of the American Federation of Labor. Mr. O'Connell's argument was an ingenious effort to make it appear that better work and more of it can be produced in a machine shop on an eight-hour than on a nine-hour basis.

Mr. O'Connell also admitted that if a Government contractor should undertake to operate a part of his plant on an eight-hour basis for Government work and the remainder on a nine-hour basis for commercial work the machinists working eight hours would expect the same daily wage, equivalent to a higher rate per hour, as the man working a longer day. As to the disturbance that would be caused in a manufacturing plant by such conditions, Mr. O'Connell made the following admission:

I have not heard any argument to the effect that the inconvenience would amount to anything more than this: If I was working alongside of another mechanic, and he was working on Government work and I was working on private work, he would quit at 4 and I might have to stay until 5; and that would have a tendency to make me feel that I would want to go home at 4 o'clock, and the result would be I would do something in the way of making trouble in order to get home at 4 o'clock. That is the only argument as to inconvenience that I have heard advanced.

It is obvious from Mr. O'Connell's statement that his organization is prepared, in the event of the passage of the pending bill, to force all plants of Government contractors and subcontractors to an eight-hour basis by "doing something in the way of making trouble," unless commercial as well as Government work is turned out on the basis of the shorter day.

In his closing remarks before the Senate committee Mr. Gompers indulged in what was regarded as a covert threat, that unless the pending bill was favorably reported unfortunate consequences might follow. In this connection he said, in part:

I hope it will not again be necessary to report our disappointment to our fellow workmen of the country. It is said that Congress will adjourn within a week or two and that it will not reconvene for the next session until December and then we shall again be told that the bill has not passed and is not a law and we will have to report more disappointments. I submit that it is not good and does not contribute to the very best to be compelled to report to 2,000,000 organized workmen constant disappointment in the enactment of a measure that is within the limits of reason and that has for its purpose the material, moral and social improvement of the workman.

Mr. Gompers' manner, quite as much as his language, conveyed a distinct threat, which was by no means relished by members of the committee and which will hardly advance the interests of the projected legislation.

W. L. C.

Some Forms of Worthington Centrifugal Pumps.

Like the steam turbine, the centrifugal pump, though the pioneer in its field, was shortly abandoned in favor of a reciprocating machine, chiefly because the principles of its action were not clearly understood, but it is now enjoying a returning popularity. The greatest obstacle in the way of its more general use in recent years has been that it was limited to low lifts—*i. e.*, heads not exceeding 50 feet. Now forms have been developed which will operate efficiently against any head up to 2000 feet. The improvements lie in the design and proportion of the parts of the pump so that it will take water from rest or a velocity of, say, 10 feet per second, bring it to the high velocity required by the head pumped against and then allow it to come to rest again in such a manner that during the whole operation there shall be as little internal friction or loss by leakage or slippage as possi-

Since it runs at moderate speed, diffusion vanes are not needed, but the volute casing has been carefully designed to obtain high efficiency. The turbine pump is suited to very high lifts, even exceeding 2000 feet.

A distinguishing feature of the turbine pump is the use of diffusion vanes which take the place of the usual whirlpool chamber in other forms of centrifugal pumps, and by giving gradually widening paths to the passage of the water assist in bringing it to rest without internal shock, converting its energy of motion into energy of static head in the most efficient manner. They correspond in function to the guide vanes of turbine water wheels. To overcome the high peripheral speed required by high lift centrifugal pumps when only a single impeller is used this turbine pump is of the multi-stage form wherein a number of triple vane impellers, each operating in a separate chamber, are mounted upon a single shaft and the water is passed successively through the impeller chambers from the discharge chamber of one to the suc-

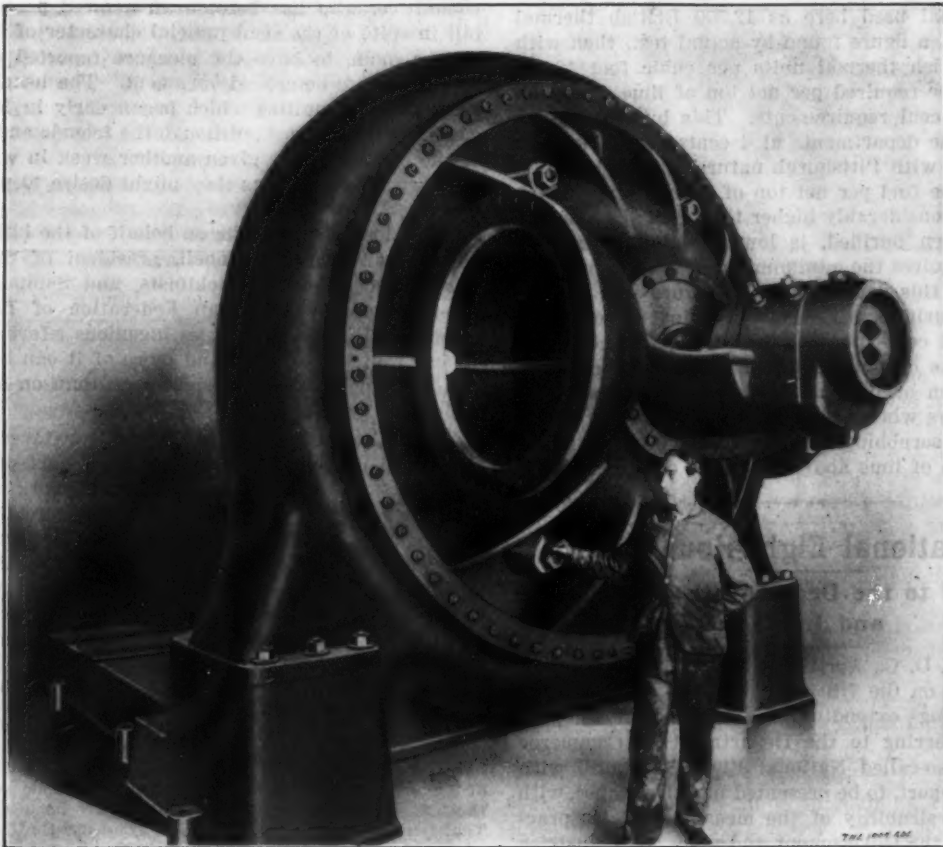


Fig. 1.—Worthington 36-inch Single Stage Turbine Pump.—Capacity, 35,000 gallons per minute against 160-foot head.—Three of these pumps, each driven by a 2000 horse-power motor, will supply the Grand Cascade at the St. Louis Exposition, 1904.

ble. The form and proportions of the passages through which the water enters the impeller chamber, the shape of the impeller vanes and the design of the chamber into which the water is delivered from the vanes are the features which have been given careful and scientific study, so that it is now possible to build a pump having almost any desired characteristics and fitted for any special requirements of service.

The centrifugal pumps illustrated herewith are manufactured by Henry R. Worthington, Inc., 114 Liberty street, New York, and are divided into three classes, conoidal, volute and turbine. The conoidal form is designed especially for low lifts up to 30 feet and large deliveries, and is adapted to irrigation work, handling of sewage and similar purposes. It is comparatively inexpensive, and, the impeller, being comparatively small in diameter, operates at high rotative speeds, making it well adapted for direct connection to electric motors or other high speed prime movers. The volute form is built for medium lifts of about 70 feet, but will safely withstand 150 feet, and is designed for all capacities.

tion opening of the next through channels in the pump casing. By this means the lift may be multiplied three, four or five times without increasing the speed beyond that suited to a steam engine or an electric motor, and within certain limits it has been found that multi-stage centrifugals are more efficient than single stage pumps due to the decrease in the frictional losses resulting from the reduced peripheral speed of the impeller. The efficiency of a multi-stage pump is the same as the efficiency of a single stage pump of the same construction. For example, if the power required by one impeller for a given delivery is 20 per cent. greater than that theoretically corresponding to the head developed, the same will be true of each impeller in the series—that is, the pump as a whole will require 20 per cent. more energy than that theoretically required to raise the water discharged to the total head. The efficiency, in other words, both of each individual stage and of the pump as a whole, would be about 85 per cent. The suppositions in these illustrations are not very far from actual performance, as an efficiency of 85 per cent. has been shown by test.

In the construction there are several mechanical details which are worthy of notice. The bearings are large, are ring oiling, and in all excepting very small sizes have been entirely separated from the pump casing, eliminating the possibility of foreign matter working into them when the pump is handling water containing solid

the interior of the chamber inclosing the base of the conoidal impeller. This partition prevents conflict between the two entering columns of water. The pump requires a space of about one-half that of an ordinary centrifugal of the same capacity.

The volute centrifugal is one of the oldest forms and

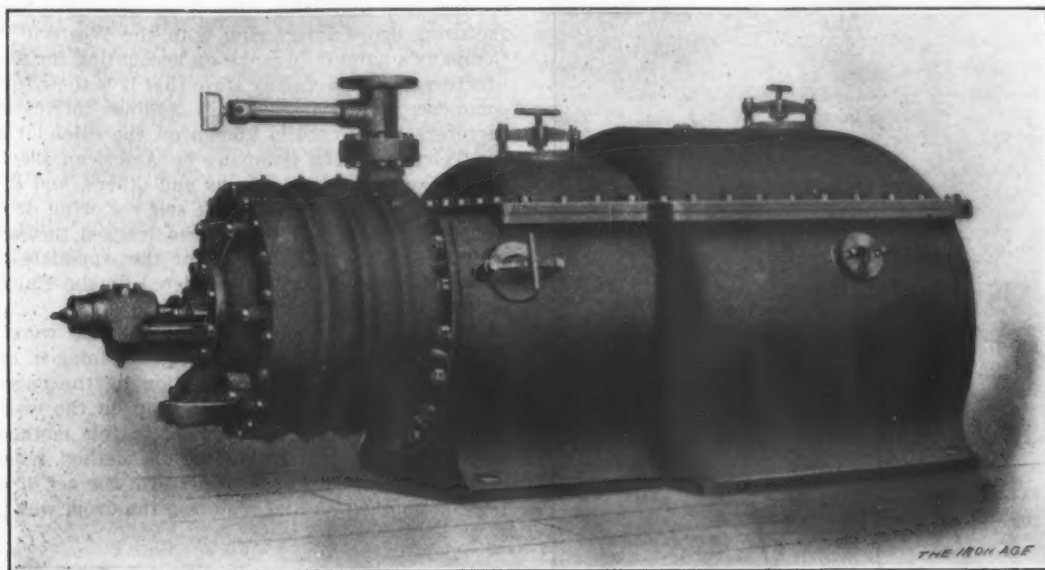


Fig. 2.—Four-Stage Turbine Pump with the Driving Motor Inclosed in a Cast Iron Housing.—Capacity, 200 gallons per minute against 500-foot head.

matter. This construction also allows renewing the bearings without entirely dismantling the pump. The diffusion vanes are disposed in the throat opening between the periphery of the impeller and the annular casing and form tangential expanding ducts from which the fluid immerses at about the velocity existing in the chamber, eliminating drag and friction between the periphery of the rapidly moving impeller and the slow moving water in the discharge chamber.

The turbine pump is a specially good form for use as a sinking or station pump for mine service, as there are no valves, guards or springs, no reciprocating parts, and, most important of all, no surfaces in contact except, of course, the shaft and its bearings. Parts subjected to the action of mine water may be made of acid resisting metal and when desired the pumps may be lead lined. The space occupied is less than one-third that required by a reciprocating pump of equal capacity, and since there are no rubbing surfaces exposed to the water the pump will run for years without renewal or repairs. In case of accident, the parts, being few and simple, may be replaced in a short time. The simplicity and reliability of the centrifugal pump recommend it for use in isolated stations on account of the small amount of attention it requires. Either an electric motor or a steam engine may be used for driving the turbine pump, but the former is preferable for mine service, as it eliminates heat, avoids the use of condensers, occupies less space, requires less attention and is more efficient. Where the mines are frequently flooded a machine constructed as shown in Fig. 2 with the driving motor inclosed in a cast iron casing permits continuous pumping even though the motor and pump be submerged to a depth of several hundred feet. A similar housed equipment for use as a sinking pump is shown in Fig. 3 and a vertical turbine pump designed for connection to a vertical shaft motor is shown in Fig. 4.

The conoidal pump, as shown in Fig. 5, somewhat resembles the ordinary centrifugal, but has a widened pump chamber to admit a special form of impeller which is balanced by admitting water from both sides. This consists of a double conoidal shaped core on which are mounted radial vanes. The peculiar shape of the core serves to gradually divert the incoming current to a radial direction and prevent sudden changes of velocity and direction whereby power is wasted. The shell is divided into two parts by a radial diaphragm extending around

embodies but few changes from the ordinary centrifugal, but possesses certain important improvements which enable it to work efficiently up to a head of 85 feet, when

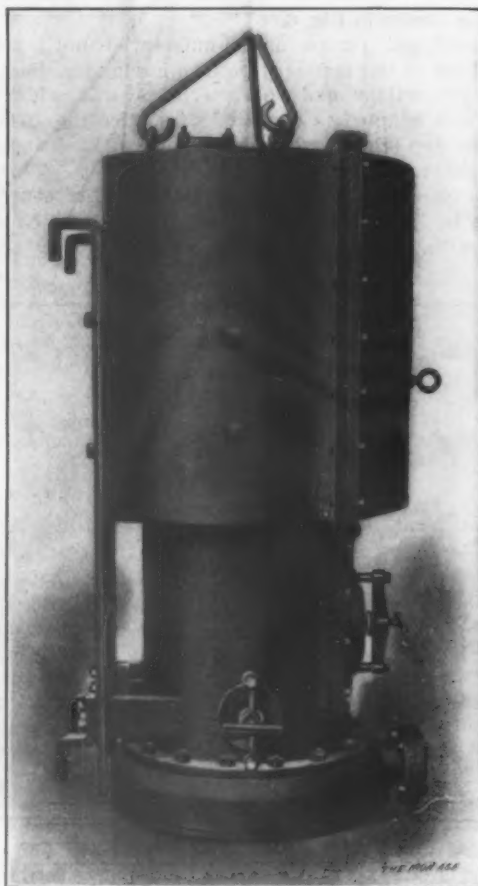


Fig. 3.—Three-Inch Single Stage Turbine Sinking Pump with Direct Connected Motor Inclosed in a Cast Iron Housing.

It has shown under test an economy of 86 per cent. The impeller is of the triple vane type employed in the turbine pumps. It is of an inclosed form and consists of

conical shaped disks, between which are the blades. Upon leaving the impeller the water is discharged into a volute casing, which is a familiar feature of most centrif-

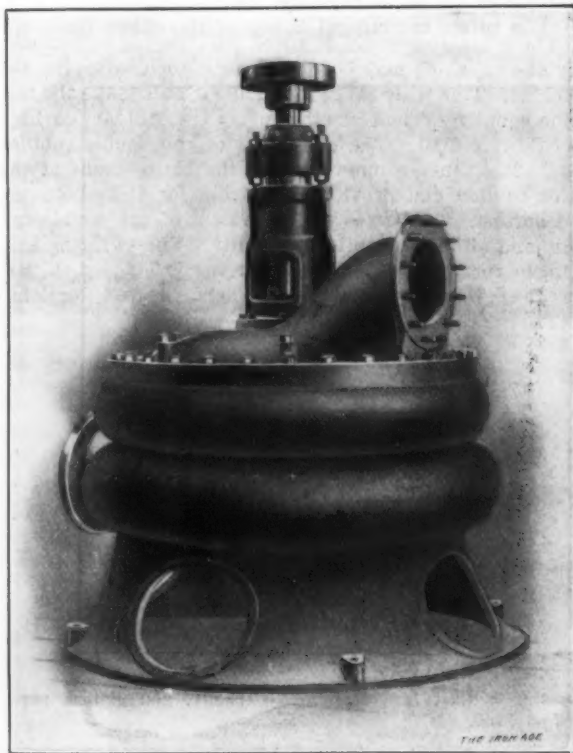


Fig. 4.—12-Inch Two-Stage Vertical Turbine Pump.—Capacity, 5,000,000 gallons per day against 140-foot head.

ugal pumps heretofore constructed. A vertical volute pump is shown in Fig. 6.

Centrifugal pumps as manufactured until recently have been of one standard pattern having practically the same proportions and characteristics, and while these were well adapted to one kind of service they were unsuitable for others, which was a great hindrance to a more general adoption of centrifugal pumps. This present movement to specialize in the design of centrifugal pumps to meet varied requirements is one which should meet with widespread approval, for there are certain

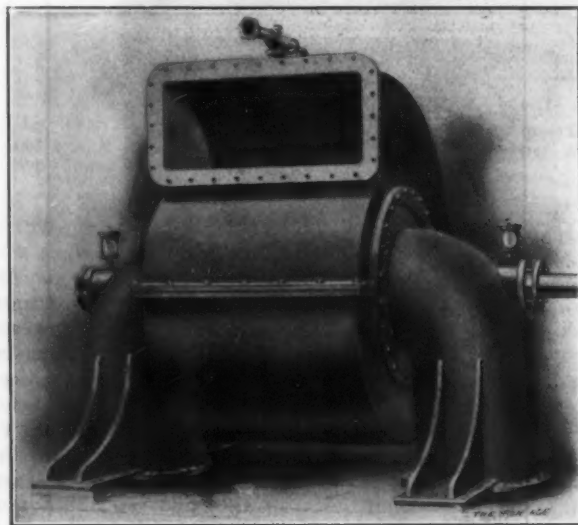


Fig. 5.—36-Inch Conoidal Pump.—Capacity, 30,000 gallons per minute against 20-foot head.

engineering advantages in rotary pumps which are not found in the reciprocating form, chiefly that they allow the selection of a means of driving which is more efficient and more readily adapted to the special conditions which very often exist.

An Important Telephone Patent Decision.

The United States Circuit Court of Appeals at Chicago, on April 12, handed down a decision sustaining the Fisk patent owned by the Western Telephone Mfg. Company, Chicago, enjoining other manufacturers of telephones and apparatus from manufacturing the self restoring drop and compelling firms who have been manufacturing drops interfering with the Western Telephone Company's patents to make an accounting for drops manufactured. The company state that it is their intention to commence action immediately against infringing manufacturers. The case is known on the calendar as Western Telephone Mfg. Company *vs.* American Electric Telephone Company, P. C. Burns and others, and it is based on what is known as the Fisk self restoring drop patent. The litigation on this patent has dragged through almost eight years, and the decision of the Appellate Court reverses a previous decision rendered by the United States Circuit Court.

The Western Telephone Mfg. Company were the first to devise a practicable means for combining in one operation the making of the connection by the operator and the restoring of the signaling drop on the switchboard. So decided was the improvement in this method of constructing switchboards that the old method, whereby two operations were required to perform the act of establishing communication and restoring the drop, was practical-



Fig. 6.—12-Inch Vertical Volute Pump.—For pumping Sewage at the St. Louis Exposition.—Capacity, 3000 gallons per minute against 60-foot head.

ly abandoned by manufacturing companies. Various devices were gotten up with the intent of avoiding the claims of the Fisk patent, or of limiting their effect, and the suit just decided was brought for the purpose of establishing the scope of the patents owned by the Western Telephone Mfg. Company, who claimed pioneer invention and reduction to practice of the principle of the restoration of the signaling drop by the connecting plug. The litigation has been vigorously fought on both sides.

The decision vitally affects practically every independent telephone operating company, and every manufacturer of independent telephone apparatus in the United States.

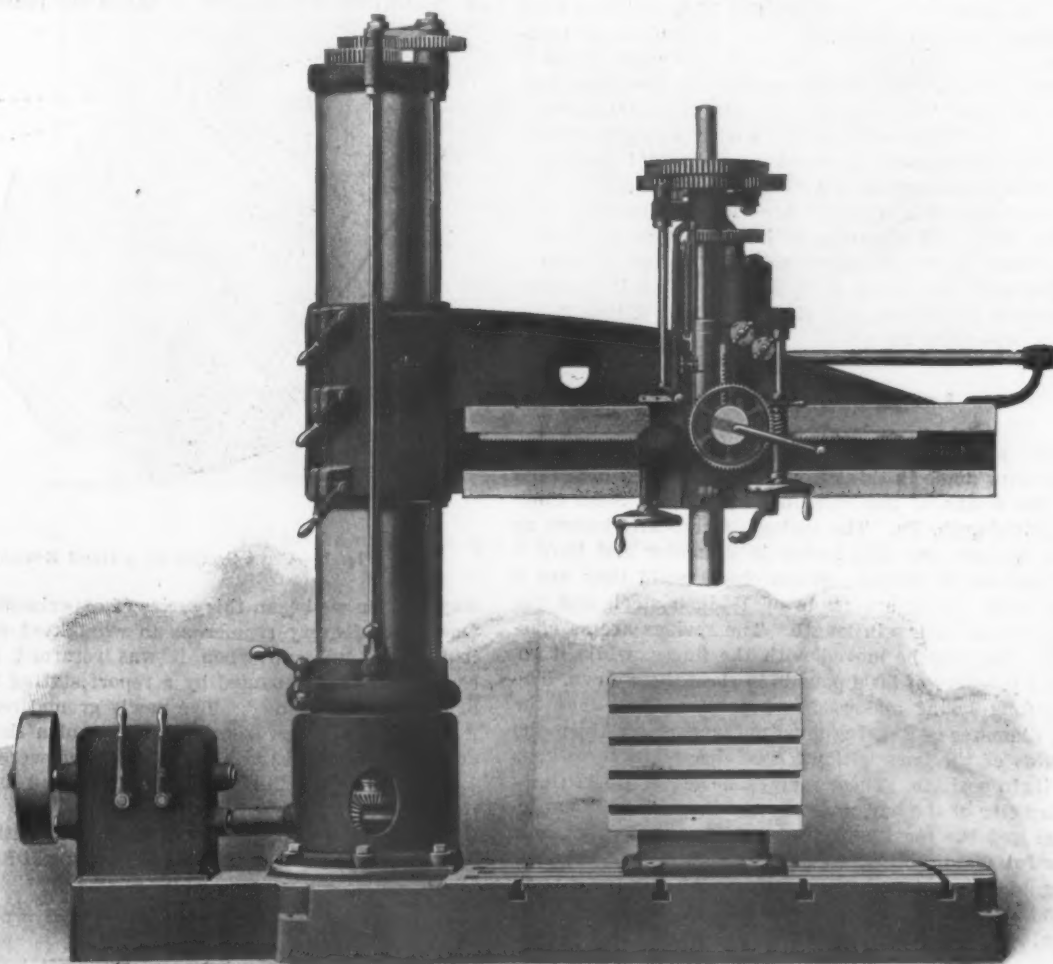
The force of about 2500 men employed at the yards of the Fore River Ship & Engine Company, Quincy, Mass., struck Monday, completely tying up operations. The strike followed the refusal of the company to accept a schedule giving a Saturday half holiday in June as well as in July and August. As in previous years it was proposed to shorten the noon hour, making the weekly schedule provide for 54 hours of work in five and half days.

The American Improved Radial Drill.

In the accompanying illustration is shown a new improved plain radial drill as manufactured by the American Tool Works Company, Cincinnati, Ohio. The entire line of these drills was completely redesigned recently, to bring them up to the standard of construction demanded by modern practice. A feature of excellence on this new drill is the feeding mechanism in the head, which is an entirely new construction. It provides eight distinct rates of speed to the spindle, any one of which may be obtained by simply turning the dial shown on the feed box until the desired feed, indexed thereon, comes opposite the fixed pointer. This method is an extremely simple one, as it requires no reference to index plates and subsequent handling of levers. The feeds operate through a friction which prevents the drill being crowded to such

they can be made of such large proportions as to prevent slipping under the heaviest cuts. The drill may be driven by a motor of any type by connecting with chain, gear or belt. If desired, the speed box can be replaced by a cone by disconnecting at the coupling on the lower driving shaft of the machine.

There are 16 changes in speed possible for the spindle, any one of which may be thrown in without stopping the machine. This wide range of spindle speeds make the machine equally efficient whether using the ordinary or high speed twist drill. The column is of the double tubular type. The inner column extends the entire height of the outer column and provides a bearing for it at both top and bottom. This gives the equivalent of the double column and affords exceptional rigidity. The swinging arm is in the form of a parabolic cantilever of box section, giving the greatest resistance to bending and torsional



THE AMERICAN IMPROVED PLAIN RADIAL DRILL.

an extent that it might strain the feed mechanism. A plate affixed to the machine gives a table indicating the proper feeds to be used with twist drills in all sizes from $\frac{1}{2}$ to $3\frac{1}{2}$ inches, inclusive. This, in connection with the dial index, enables the operator to secure immediately the proper feed for the twist drill he is using. It involves no guesswork, saves a great deal of time and insures the drill being used to its full capacity. The feeds can be automatically tripped at any position of the spindle by an adjustable trip dog and pointer acting on the worm clutch. Two or more dogs can be supplied, making it possible to counterbore any number of holes without resetting. The spindle is graduated to indicate the depth, giving all readings from zero. The tripping acts automatically at the full depth of the spindle obviating the danger of breaking the feed mechanism.

The speed box is of the geared friction type, providing four changes of speed, each being instantly available by use of the two levers shown. The frictions are of the patent double band form, and consist of very few parts so

strain. The lower side is parallel with the base, and the guides are extended so that work may be operated upon close up to the column. The arm is raised and lowered rapidly by a double thread coarse pitch screw hung on ball bearings and controlled instantly by a convenient lever. Back gears are located on the head, thus making the greatest speed reduction at the spindle. They may be engaged or disengaged without shock or jar while the machine is running. The drill spindle is counterbalanced and has a frictional quick advance and return. A tapping mechanism is carried on the head between the back gears and speed box where its frictions have the benefit of the back gear reduction, making it possible to perform unusually heavy tapping work. It also permits the taps to be backed at an accelerated speed. A lever for starting, stopping or reversing the spindle is controlled at the head from the front of the machine.

Ironworkers at Conshohocken, Pa., have asked for a raise in wages and will receive their answer on April 23.

Liberty Furnace Rebuilt.

The Monarch Blast Furnace Company, proprietors of the old Liberty Furnace, Shenandoah County, Va., have rebuilt the furnace and railroad. The furnace is 12 x 55 feet, with a capacity of 40 to 50 tons of warm blast charcoal iron per day, and is thoroughly equipped with all modern improvements, including a laboratory which cannot be surpassed in the State. The works are situated at Liberty, but the shipping point is at Edinburg, on the Southern Railway, and the railway of 16 miles which the furnace company have just built and equipped connects the two points.

The plant is self contained, having its own ore, wood for charcoal purposes, limestone, and a good vein of coal which will be opened up later. The ore runs, according to analysis, from 46 to 57 per cent. metallic iron, and as low in phosphorus as 0.008, the highest being 0.02. The manganese ore contains a large percentage of manganese, and a high grade of spiegel was made from it in former years. The limestone runs 95 per cent. carbonate of lime. The property consists of 18,500 acres of land, 18,000 of this being covered with a heavy growth of timber which will be used for charcoal purposes. Many will be interested in knowing that the old Liberty Furnace, whose iron was well known in the market from 1812 to 1893, will again be in blast; not as in former years, when it turned out only 10 to 20 tons of iron a day, but with improved equipment enabling it to more than double its old output. L. & R. Wister & Co., Philadelphia, are sales agents.

Large Spiral Springs.

What are claimed to be two of the largest spiral springs ever made in this country were shipped last week from the works of the Pittsburgh Spring & Steel Company, Pittsburgh, Pa. The springs, technically known as helical springs, are 27½ inches in diameter and have a free height of 34 inches. When closed solid they are 9 inches high. They are made of 1½-inch steel, and the bars were 533 inches in length. The springs are so elastic that they can be moved with the finger, while it requires a pressure of 3000 pounds to close them down. The rule among spring makers has heretofore been that the inside diameter of a spring must not be over ten times the thickness of the bars without special appliances to keep the coils in position. These springs, however, are 17 times the diameter of the bar, and only the most skillful manipulation and the most improved appliances secured their successful manufacture. The weight is 246 pounds per spring, and it required expert treatment to handle them hot and allow within a ¼ inch for the contraction of a bar of steel 533 inches long when tempering.

The Dover Forge & Iron Company.

The Dover Forge & Iron Company, Canal Dover, Ohio, reorganized recently, have elected the following officers: A. J. Krantz, president; J. A. Krantz, treasurer, and Ambrose Beard, secretary. The company will manufacture merchant bar iron of both ordinary and highest grades, including pure charcoal knobbed iron. The plant will contain a modern muck mill, squeezer, steam hammers, and all accessories for producing highest quality at lowest possible cost. It is understood that finishing departments will be added gradually, commencing in the near future. At present the output will consist of strictly iron sheet bars in three qualities, suitable for making sheets for corrugating, stamping or galvanizing, to be followed soon with strictly charcoal iron tin bars for use in making roofing tin and enameled ware. The company will not manufacture sheets or tin plate.

A dispatch from London gives the total tonnage of battle ships now building and projected as follows:

United States.....	209,180
Great Britain.....	187,000
Russia.....	125,270
Germany.....	103,970

Reamer Clearances.

BY FRED. HOLZ.*

After constant experimenting for more than a year, we have finally succeeded in establishing tables for four styles of reamers for obtaining the best possible clearances, the object being to grind clearances on reamers which would ream the greatest number of smooth holes with a minimum amount of wear. The four styles of reamers are as follows:

Hand reamers for steel.

Hand reamers for cast iron and bronze.

Chucking reamers for cast iron and bronze.

Chucking reamers for steel.

We use adjustable blade reamers almost exclusively, all of which are ground in the tool room. No one outside of the tool room is allowed to adjust the reamers in any

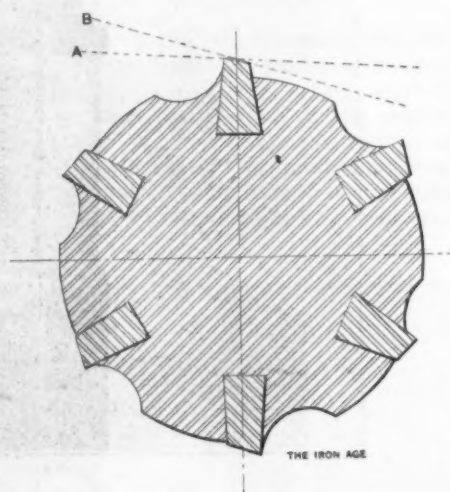


Fig. 1.—Cross Section of a Hand Reamer.

way. When we began this series of experiments, a report was kept of every reamer as to what kind of clearance it had ground, and when it was returned to the tool room it was accompanied by a report stating the number of holes it had reamed. The newly ground reamers were made to ream holes from one-quarter of a thousandth to one-half of a thousandth above size, and were allowed to wear down to standard size when they had finished their performance.

Various kinds of clearances were tried with varied results, until we reached a limit of reaming 1070 holes with

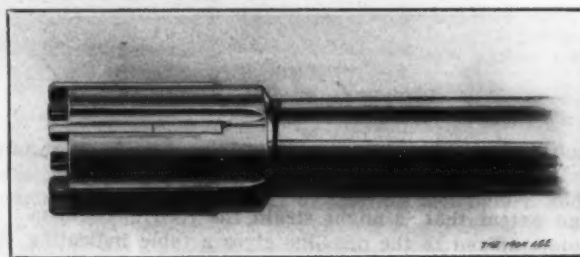


Fig. 2.—Chucking Reamer for Reaming Steel.

the same hand reamer before it showed any sign of needing regrinding or readjusting. These holes were ⅞ inch in diameter, 1 inch long, in parts made from shafting material known as hub stock. These holes were from 0.001 to 0.002 under size before hand reaming, and were perfectly smooth when finished. When reaming cast iron or bronze, only 200 or 300 pieces could be reamed, since the wear of the reamer on these materials is much greater than in steel, although could the error limits of the holes be greater, of course, a larger number could be reamed before the reamer would need readjustment. In our practice we aim to have all holes as near stand-

* President of the Cincinnati Milling Machine Company, Cincinnati, Ohio.

ard as possible, and the variation in the fits, such as for running and driving, is made in the shafts.

Fig. 1 shows a hand reamer. It will be noticed that there are two clearances ground on it, A and B. A small

The beveled ends have only one clearance, equaling the second clearance given in table No. 3.

Fig. 2 represents a chucking reamer for reaming steel. In this case the knives are circular ground to exact size

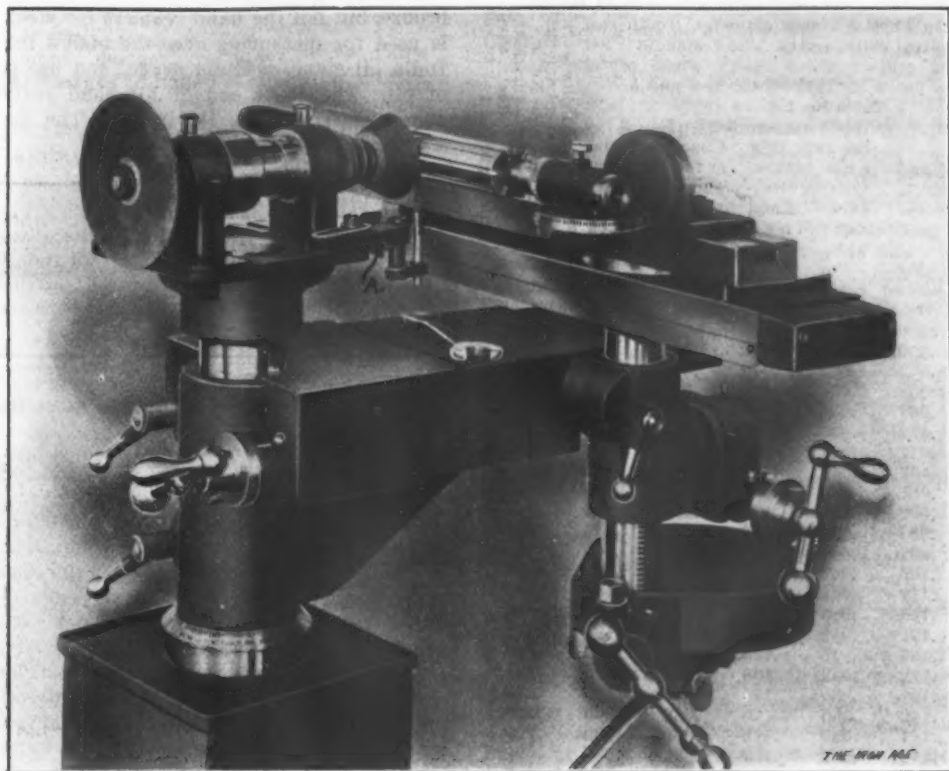


Fig. 3.—Showing Tooth Rest Held on Emery Wheel Head.

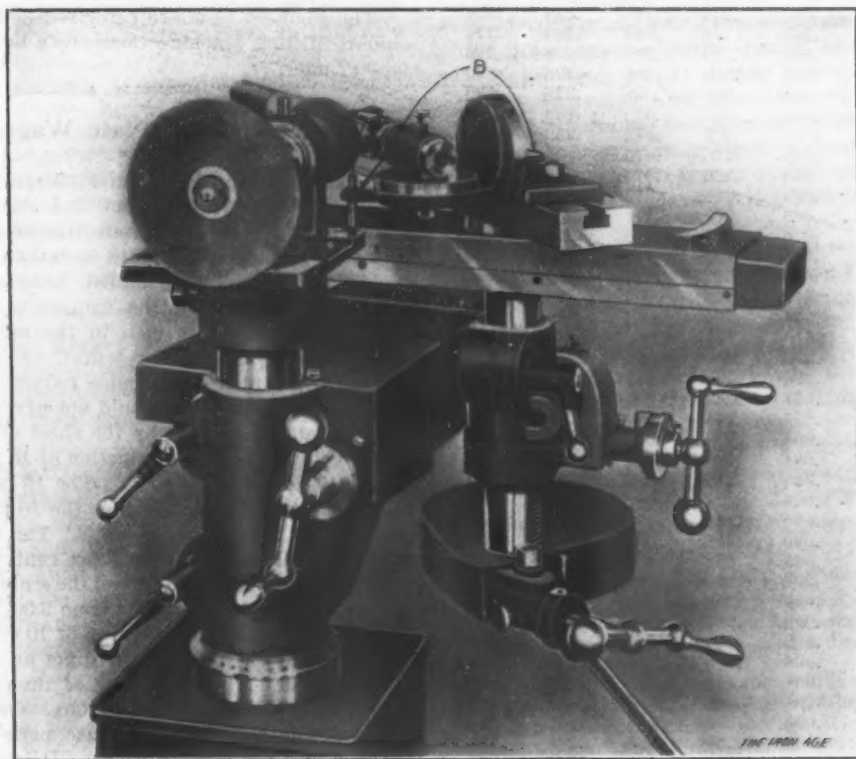


Fig. 4.—Showing Tooth Rest Supported from the Grinder Table.

CINCINNATI UNIVERSAL CUTTER AND TOOL GRINDER.

land 0.025 inch wide is left on all hand reamers for cast iron and bronze, while a land of only 0.005 inch is left on hand reamers for steel. Chucking reamers for cast iron or bronze have 23-degree beveled ends and are provided with two clearances along the blades. (See table No. 3.)

of hole to be reamed. The 45-degree beveled ends only have clearances. (See table No. 4.) On all reamers of this style the knives are ground from 0.015 to 0.020 inch below size half of their length, toward the shank end. (See Fig. 2.)

In grinding the clearances for the various kinds of reamers as given in tables Nos. 1, 2 and 3 the tooth rest is held stationary on the emery wheel head of the grinder (A, Fig. 3), while for the clearance for the 45-degree

Reamer Clearance.—All quantities are given in inches.

Ground with cup wheel 3 inches diameter. Tooth rest to be set central with emery wheel spindle. Set work holding centers above emery wheel center amount given below in Tables Nos. 1, 2 and 3.

Table No. 2.—

Table No. 1.—Hand reamer for steel. Cutting clearance. Land .006 inch wide.		Hand reamer for cast iron and bronze. Cutting clearance. Land .025 inch wide.		Table No. 3.—Chuckling reamer for cast iron and bronze. Cutting clearance. Land .025 inch wide.		Table No. 4.—Chuckling reamer for steel. Cutting clearance on angle.	
Size of reamer.	For cutting clear-ance.	For second clear-ance.	For cutting clear-ance.	For second clear-ance.	For cutting clear-ance.	For second clear-ance.	For cutting clear-ance.
1/2	.012	.052	.032	.072	.040	.080	.080
5/16	.012	.057	.032	.072	.040	.080	.080
3/8	.012	.062	.032	.072	.040	.090	.090
7/16	.012	.067	.035	.095	.040	.100	.100
1/2	.012	.072	.035	.095	.040	.100	.100
9/16	.012	.077	.037	.095	.045	.125	.125
5/8	.012	.082	.040	.120	.045	.125	.125
3/4	.012	.087	.040	.120	.045	.125	.125
1 1/16	.012	.092	.040	.120	.045	.125	.125
1 1/8	.012	.097	.040	.120	.045	.125	.125
1 1/4	.012	.102	.040	.120	.045	.125	.125
1 3/8	.012	.106	.042	.122	.045	.125	.125
1 1/2	.012	.112	.045	.145	.050	.160	.160
1 5/8	.012	.118	.045	.145	.050	.160	.160
1 3/4	.012	.122	.045	.145	.050	.160	.175
1 7/8	.012	.127	.045	.145	.055	.175	.175
2	.012	.132	.048	.168	.055	.175	.175
2 1/16	.012	.137	.050	.170	.055	.175	.175
2 1/8	.012	.142	.050	.170	.060	.200	.200
2 1/4	.012	.147	.050	.170	.060	.200	.200
2 3/8	.012	.152	.052	.192	.060	.200	.200
2 1/2	.012	.157	.052	.192	.060	.200	.200
2 5/8	.012	.162	.056	.196	.060	.200	.200
2 3/4	.012	.167	.056	.196	.064	.200	.200
2 7/8	.012	.172	.056	.216	.064	.224	.225
3	.012	.172	.056	.216	.064	.224	.225
3 1/16	.012	.172	.059	.219	.064	.224	.225
3 1/8	.012	.172	.059	.219	.064	.224	.225
3 1/4	.012	.172	.063	.223	.064	.224	.225
3 3/8	.012	.172	.063	.223	.064	.224	.225
3 1/2	.012	.172	.063	.223	.068	.228	.230
3 5/8	.012	.172	.063	.223	.068	.228	.230
3 3/4	.012	.172	.065	.225	.072	.232	.230
3 7/8	.012	.172	.065	.225	.072	.232	.230
4	.012	.172	.065	.225	.075	.235	.235
4 1/16	.012	.172	.065	.225	.075	.235	.235
4 1/8	.012	.172	.065	.225	.077	.237	.240
4 1/4	.012	.172	.065	.225	.077	.237	.240
4 3/8	.012	.172	.070	.230	.080	.240	.240
4 1/2	.012	.172	.070	.230	.080	.240	.240
4 5/8	.012	.172	.072	.232	.080	.240	.240
4 3/4	.012	.172	.072	.232	.080	.240	.240
4 7/8	.012	.172	.075	.235	.083	.243	.245
5	.012	.172	.075	.235	.083	.243	.245
5 1/16	.012	.172	.078	.238	.087	.248	.245
5 1/8	.012	.172	.081	.241	.087	.247	.245
5 1/4	.012	.172	.081	.241	.090	.247	.245
5 3/8	.012	.172	.084	.244	.090	.250	.250
5 1/2	.012	.172	.084	.244	.090	.250	.250
5 5/8	.012	.172	.087	.247	.093	.253	.250
5 3/4	.012	.172	.087	.247	.093	.253	.250
5 7/8	.012	.172	.090	.250	.097	.257	.255
6	.012	.172	.090	.250	.097	.257	.255
6 1/16	.012	.172	.093	.253	.100	.260	.255
6 1/8	.012	.172	.093	.253	.100	.260	.255
6 1/4	.012	.172	.096	.256	.104	.264	.260
6 3/8	.012	.172	.096	.256	.104	.264	.260
6 1/2	.012	.172	.096	.256	.106	.266	.260
6 5/8	.012	.172	.096	.256	.106	.266	.265
6 3/4	.012	.172	.096	.256	.106	.266	.265
6 7/8	.012	.172	.096	.256	.108	.268	.265
7	.012	.172	.098	.258	.108	.268	.265
7 1/16	.012	.172	.100	.260	.108	.268	.265
7 1/8	.012	.172	.100	.260	.108	.268	.265
7 1/4	.012	.172	.100	.260	.110	.270	.270
7 3/8	.012	.172	.100	.260	.110	.270	.270
7 1/2	.012	.172	.104	.264	.114	.274	.275
7 5/8	.012	.172	.104	.264	.114	.274	.275
7 3/4	.012	.172	.106	.266	.116	.276	.275
7 7/8	.012	.172	.106	.266	.116	.276	.275
8	.012	.172	.110	.270	.118	.278	.275
8 1/16	.012	.172	.118	.278

* Mount tooth rest on table of machine.

† Mount tooth rest on emery wheel head.

‡ Angle on end of blade 45 degrees.

beveled ends on the chucking reamers for steel the tooth rest is supported from the grinder table and travels with the work. (See B, Fig. 4.)

Fig. 5 represents a handy means for holding a small oil stone used in stoning the reamers. We oil stone our chucking reamers and hand reamers for cast iron and bronze, but not the hand reamers for steel. A micrometer is used for measuring over the blades for size. We use India oil stone, medium grade, and use gasoline instead of oil. The front end of all hand reamers is tapered about 0.005 inch in 1 1/4 inches. The back end of the



Fig. 5.—A Convenient Oil Stone Handle.

blade is also slightly tapered, so as not to injure the hole in backing out the reamer.

There seems to be a difference of opinion as to which direction an emery wheel should run, whether it should run to or from the cutting edge of the reamer. The danger of carrying the heat to the edge is much greater when the wheel runs toward the edge, and thus the grinding must proceed more slowly and carefully. We grind all of our cutters and reamers whenever possible with the emery wheel running in a direction away from the edge. It requires very little practice on the part of the operator to hold the work to the tooth rest, and the result is more satisfactory, since it leaves a cleaner cutting edge, while the danger of overheating is reduced. In order to carry out this work precisely it was necessary to provide the grinder with a micrometer dial on the vertical adjustment, as shown by D, Fig. 3.

The reamers as above described are ground on a Cincinnati Milling Machine Company's universal cutter and tool grinder.

Sheet and Tin Plate Wages Settled.

After conferences held in Pittsburgh, Pa., lasting for a whole week, a settlement has finally been reached in regard to the proposed reduction of 20 per cent. in the wages of sheet and tin plate workers in the union mills that signed the Amalgamated Association scale. The original proposition of the manufacturers had been rejected by vote of the men in the mills. On Tuesday, April 12, the men's representatives in the conference offered to accept a compromise reduction of 15 per cent. This the manufacturers would not agree to, and the matter was settled April 14 by the sheet and tin plate workers agreeing to accept a reduction of 18 per cent. in wages on the 1903-1904 wage scale. The 18 per cent. reduction in the sheet mill scale includes the 10 per cent. cut made on January 1 in the union mills. The screw boys in the tin plate mills are cut only 5 per cent.

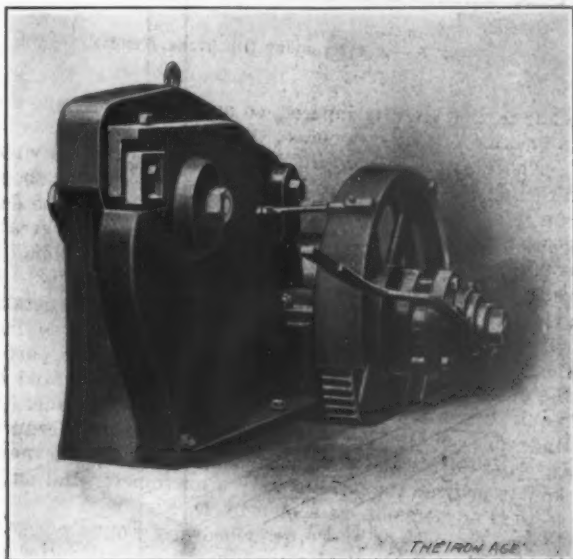
It was also decided to extend the scale base of Nos. 26, 27 and 28 gauges of steel sheets from 2.50, the old minimum, to 2.30 cents. For each advance of 10 cents over this base price of 2.30 cents the men will get an advance in wages of 2 per cent. The scale base of tin plate was also extended from \$3.60 to \$3.40 per box. On each increase of 10 cents per box over this base price the men get an advance of 2 per cent. in wages. It is expected that this arrangement, which continues in force until June 30 next, will be satisfactory to the union sheet and tin plate mills. It is thought probable, moreover, that this new wage scale will be ratified and adopted at the annual convention of the Amalgamated Association of Iron, Steel and Tin Workers, to be held in Cleveland, Ohio, early in May.

These new wage scales went into effect on April 4, and under the new base price in the sheet scale of 2.30 cents for Nos. 26, 27 and 28 gauge, it will require an advance of \$4 a ton in sheets before the men will get an ad-

vance in wages. The present market price of No. 26 gauge black sheets, box annealed, one pass through cold rolls, is 2.10 cents, No. 27, 2.20 cents and No. 28, 2.30 cents, or an average for the three gauges of 2.20 cents, Pittsburgh. As the base of the scale is 2.30 cents, it will require the average price of these three gauges to go to 2.40 cents, or \$4 a ton higher, before the men will get an advance. In tin plate an advance of 10 cents a box over the base price of \$3.40 per box will give the men an advance of 2 per cent in wages.

The Badger Alligator Shear.

The accompanying illustration shows one of the various sizes of alligator shears built by the Rock River Machine Company, Janesville, Wis. They are of compact and substantial design, and are very serviceable for shearing flat and round stock. The machines are fitted with a clutch for stopping and starting the knives while the fly wheel is in motion. The lever which actuates the knife is trunnioned on a steel king bolt of large proportions, and



THE BADGER ALLIGATOR SHEAR.

is connected to the eccentric yoke by means of a knuckle joint. All wearing surfaces are accurately machined and fitted. It is built of best material, and possesses power and rigidity, allowing it to shear with ease round iron up to sizes of $1\frac{1}{2}$ inches in diameter and flat bars up to a cross section of $\frac{5}{8}$ x 6 inches.

The Carnegie Hero Fund.—Andrew Carnegie has created another humanitarian fund and endowed it with \$5,000,000. His beneficence provides for the dependents of those losing their lives in the United States and Canada in heroic efforts to save their fellow men or for the heroes and heroines themselves, if injured. Medals are also to be given. His decision to create the fund came immediately after the Harwick mine disaster, in which 178 men and boys lost their lives. It is to be called the Hero Fund. A commission has been named for carrying out the provisions, composed of W. L. Abbott, Edwin H. Anderson, W. W. Blackburn, Edward Bigelow, Hon. Joseph Buffington, William N. Frew, Rev. W. J. Holland, D.D., John B. Jackson, Thomas Lynch, Charles C. Mellor, T. N. Miller, Thomas Morrison, Frederick C. Perkins, Robert Pitcairn, Hon. H. Kirk Porter, James H. Reed, W. L. Scaife, William Scott, W. H. Stevenson; Charles L. Taylor, president; F. M. Wilnot, secretary. The commission met April 15 in Pittsburgh and perfected an organization.

The third annual meeting of the United States Steel Corporation was held on April 18 at Hoboken, N. J. The meeting was attended by about 100 persons, most of whom were individual stockholders, representatives of the com-

pany, clerks or reporters. The company's representatives were: E. H. Gary, chairman of the Board; Francis Lynde Stetson, general counsel; Richard Trimble, secretary and treasurer, and W. J. Filbert, controller of the corporation. The majority for the management was overwhelming, a motion for a permanent investigation committee of stockholders finding little support. The acts of the directors during the last year were ratified, and the following were re-elected directors of the corporation: J. Pierpont Morgan, Henry H. Rogers, E. H. Gary, George W. Perkins, Charles M. Schwab, Henry Phipps, E. C. Converse and James Gayley.

The New England Foundrymen's Association.

The monthly meeting of the New England Foundrymen's Association was held at the Exchange Club, Boston, Wednesday evening, April 13. President B. M. Shaw occupied the chair. Henry Souther of the Henry Souther Engineering Company, Hartford, Conn., gave a talk on the subject of "Specifications for Cast Iron," taking the report of the Committee of the Society for Testing Materials as his basis, which report has been printed in detail in *The Iron Age*. Mr. Souther favored the adoption of the standard test bar as suggested by the committee. He read correspondence with a number of interested parties, most of whom opposed this standard of testing.

After dinner there was an open discussion on the following subjects:

"How Do You Figure the Cost of Iron in the Ladle?"

"What is Your Highest Percentage of Good Castings Obtained?"

"What is Your Experience With Anthracite Coal in Cupola Practice?"

"When using iron, which has been bought on analysis, specifying that the iron should run between certain fixed limits in carbon, silicon, phosphorus, manganese and sulphur, have you found the results the same, no matter what part of the country the iron comes from, provided it is melted under the same conditions and comes within the specifications—that is, whether it comes from Alabama, Tennessee, Virginia, Pennsylvania, or any other locality?"

A number of members took part in this discussion. John O. Henshaw of Boston took up the last question, arguing that there is a variation based on locality of production of the ore, and Walter M. Saunders of Providence took the same stand. Henry Souther believed that with the same analysis, carrying it on to include analysis for copper, the results would be the same. William H. Bense of the Kinsley Iron & Machine Company, Canton, Mass., gave his company's system of figuring costs of iron in the ladle. Other members participated in the general discussion.

A communication was read from the Philadelphia Foundrymen's Association inviting the New England Association to meet with the Pittsburgh and Philadelphia associations at the Manufacturers' Club, Philadelphia, May 4. It was voted to accept this invitation, and to send Secretary Fred F. Stockwell, as the New England Association's formal representative. Other members expect to be present.

John Magee introduced a motion embodying a memorial to the American Foundrymen's Association, and a committee of three, consisting of Mr. Magee, Joseph L. Anthony and Arthur W. Gibby, was appointed to submit the memorial, which follows:

Whereas, We, the New England Foundrymen's Association, have recently had presented before us, by Thomas A. West, a most original and instructive paper embodying new thought in regard to the hardness of packed bodies of sand constituting a mold for casting metals; and

Whereas, We have been shown in connection with said paper a novel device whereby the degree of hardness of said sand may be reliably measured; and

Whereas, It is at the present time impossible to obtain any exact information on this subject, except such comparative information, in many cases of rather doubtful value, as may be personally conveyed; be it therefore

Resolved, That we, the members of the New England Foundrymen's Association, through our undersigned committee, do hereby petition the members of the American Foundrymen's Association that they shall establish a committee of five members, or such number as shall seem best to their chairman, for the purpose of investigating, measuring and classifying the hardness of molds, to establish proper standards of measurement

for the same, and to list such classes of work as shall seem to them to be of most suitable degree of hardness for the mold in such class of work.

A. E. McClintock of Detroit, secretary of the National Founders' Association, made a report of the failure of the conference between committees representing the National Founders' Association and the Iron Molders' Union of North America, during which no agreement was reached as to the relations between employers and employees. Mr. McClintock outlined the policy of the Administrative Council of his association as prepared after the failure of the conference, which recommendation will be submitted to the members for their approval.

Henry A. Carpenter of Providence sent a letter reporting on the progress of the work of establishing a foundry exhibit at the St. Louis Exposition.

The American Universal Saw Bench.

The accompanying illustrations show in various positions a new universal saw bench made by the F. H. Clement branch of the American Wood Working Machinery Company of New York City. It has been the practice in machines of this sort to make the table tilt to both sides, a feature which necessitated a somewhat complicated and cumbersome construction. This is obviated in the machine shown by making the work guides detachable, allowing them to be mounted on either side of the saw, so that tilting the machine to one side only may be made to answer for inclined work at any angle.

The box frame is cast in one piece and has three

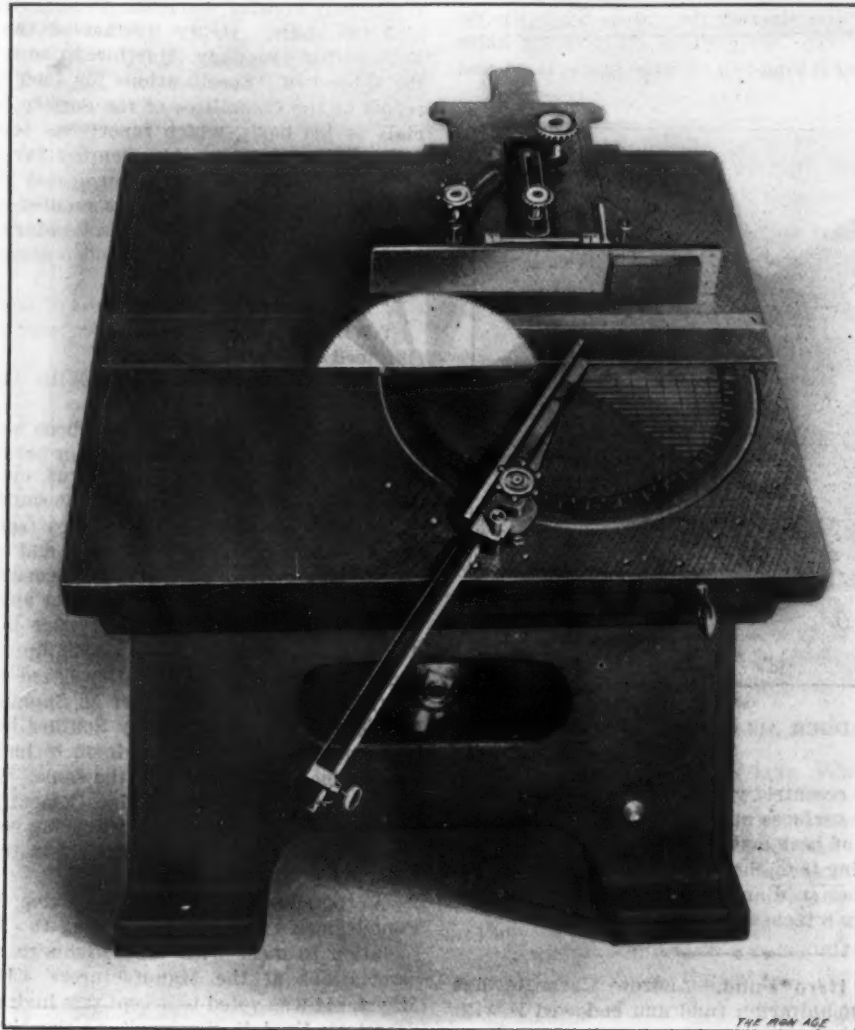


Fig. 1.—View from One Side with Table Tilted, Showing the Arrangement of the Gauges.

Resolutions were adopted on the deaths of Loren H. Stannard of New Haven, and S. K. Lovewell of Chelsea.

Statistics have been compiled which show that during the past six months the railroads of this country have ordered only 29,540 freight cars, against 133,420 ordered during the corresponding period the previous year. During the past six months the locomotive orders amounted to 634, as compared with 2459. The statement is made that more freight cars and locomotives were ordered during the single month of October, 1902, than have been ordered during the entire last six months. The falling off in the equipment orders of railroads thus corresponds with the reduction in the orders placed for steel rails for delivery this year.

The Tabor Mfg. Company, Philadelphia, Pa., have opened an office in the Mason Building, 70 Kilby street, Boston, Mass., which is in charge of C. S. Lovell.

points of support on the floor, which insures rigidity and avoids any tendency of springing or straining any part. The arbor yoke is extra long and carries two cast steel arbors, each $1\frac{1}{4}$ inches in diameter and supported in long self oiling bearings, with the pulley between and the saw overhung at one end. (See Fig. 3.) The yoke swings on gudgeons on both sides of the saw line. The main one is 7 inches in diameter and has side bearing shoulders $9\frac{1}{2}$ inches in diameter, with a suitable adjustment for wear. The circular adjustment and rotation of the yoke is accomplished by a heavy worm wheel and a double pitch worm, adjustable longitudinally and laterally to take up wear. The construction enables the exchanging of the saws with but slight loss of time and is attended with no lost motion in the connections. The table is 45 inches long and 39 inches wide, divided into two sections, the movable left hand one being 17 inches wide and the right hand one 22 inches. The left hand section moves on nonfriction rollers and is guided on a planed and scraped

way, insuring an accurate cut. By means of an intermediate frame or spider it can be drawn away from the main section $2\frac{1}{2}$ inches to admit dado heads or special cutters. The entire table is unusually heavy and strongly ribbed and can be tilted to 45 degrees or any intermediate

required dimension of work can be set without previously determining the angle in degrees, saving time and calculating. For long work a steel rod is furnished with an adjustable end stop, which recedes for cropping off ends. It can be used for any length between 2 inches and 5 feet 3 inches.

A supplementary cut off gauge is also supplied which is fitted to the right hand table, being guided in the head parallel with the saw. It consists of a swiveling fence graduated 45 degrees both ways from a position at right angles with the plane of the saw, and is arranged to be connected when desired with the main cut off gauge by a yoke or arch, which passes over the saw and makes a long, well supported gauge for large work. When the supplementary cut off gauge is not in use the fence is detached from its guide tongue, and the latter is turned over in its slot to make a flush surface on the table, as indicated in Figs. 1, 2 and 4. A special sleeve is provided for the attachment of dado heads up to 2 inches thick, which takes the place of a nut and loose collar on the

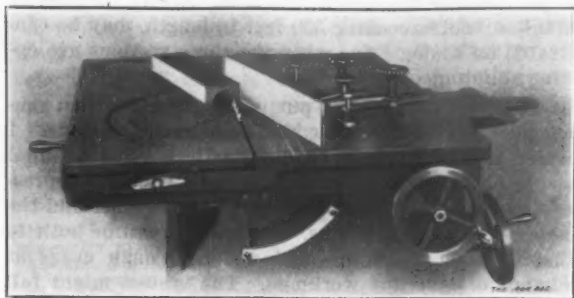


Fig. 2.—The Setting of the Saw for Cutting Core Boxes.

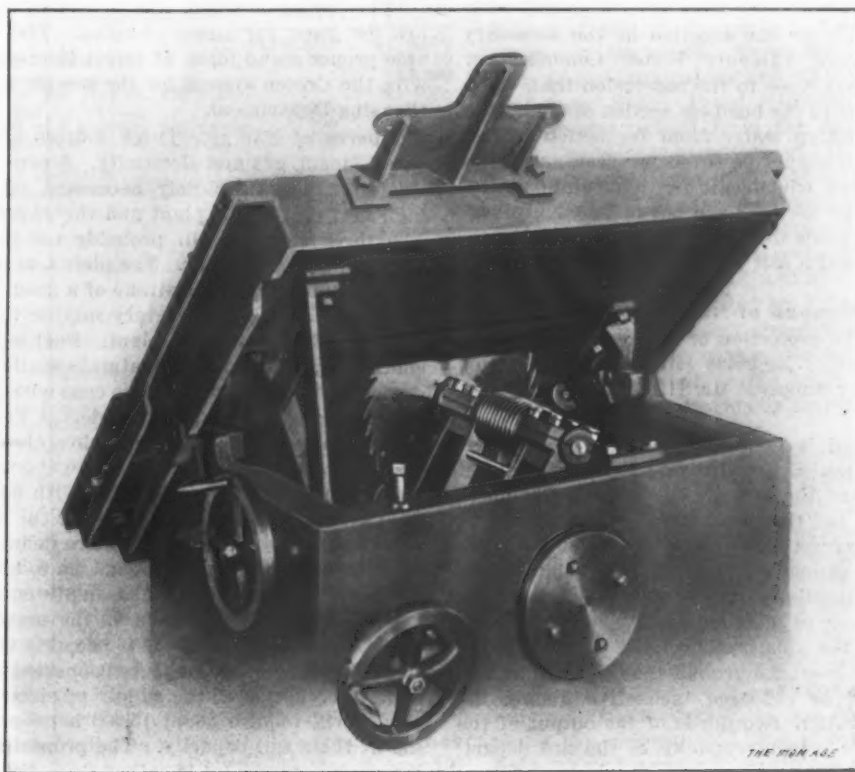


Fig. 3.—View of Opposite Side from Fig. 1.—Table tilted, showing one end of the arbor yoke.

angle by means of a screw and radius arm, all bearings of which are adjustable for wear. An accurately graduated arc and index are provided on the front of the machine to indicate the angle, and a stop at the rear of the frame directly in line with the radius arm holds the table square with the saws when in its horizontal position.

The gauge plate or guide for use when rip sawing moves over the entire width of the main table, and will admit any width of board from 0 up to 24 inches, and the fence may be tilted to 45 degrees from the vertical. The entire gauge also swings on one of the retaining pins to any horizontal angle with the saw for cutting core boxes, &c., as illustrated in Fig. 2. In addition to the positive adjustment by means of the taper pins, there is a micrometer adjustment of 8 inches afforded by a steel rack and pinion, which makes the movement quick and accurate. This side of the table has a rule graduated to inches and eighths for cutting off work to a given length.

The cut off or miter gauge is swiveled on the rolling table section and may be accurately set at all principal angles by means of a taper pin and stop holes. A complete half circle protractor is let into the table, which assists in setting intermediate angles. A novel feature is the provision as a part of this protractor of a cross graduated sector by which angles corresponding to any

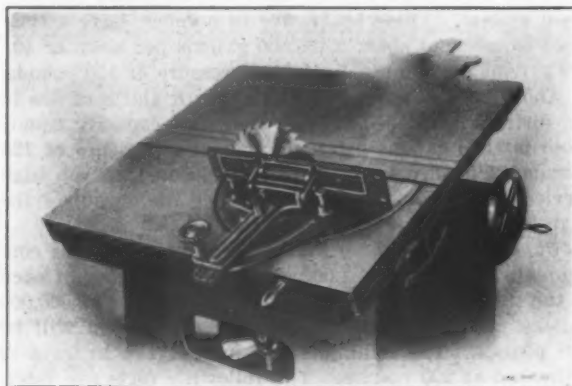


Fig. 4.—Ripping Gauge Transferred to Rolling Table Section.

saw arbor. The machine requires $\frac{3}{4}$ horse-power for driving and weighs 2100 pounds.

About 150 employees of the foundry of the Saco & Pettie Mfg. Company, Biddeford, Maine, are on strike for an increase in wages.

High Pressure Fire Service for New York City.

The New York Board of Aldermen have made the appropriation necessary to carry into effect the project passed upon by the Board of Estimate and Apportionment for the installation of a high pressure service. The appropriation calls for \$5,425,400. The reports of the engineers, which were unanimously accepted by the Board of Estimate and Apportionment, provide not only for the salt water system, but for the improvement of the present fresh water system and the establishment of adequate means of flushing the city streets with salt or fresh water or both, as may be found expedient in the future. One-tenth of the area of Manhattan and one-thirty-second of that of Brooklyn will be served. The Manhattan territory includes the dry goods section and the lower tenement district on the East Side. The Manhattan system is to cost \$3,950,400 and the Brooklyn service is to be installed for \$1,475,000.

The statement is made that the first work to be undertaken will be done at Coney Island. As soon as the legal preliminaries as to advertising have been complied with, bids will be received for the erection of the necessary plant at the seashore. Deputy Water Commissioner Thomas F. Byrnes has come to the conclusion that, while there is pressing need in the business section of New York and on the old Brooklyn water front for action in this matter, Coney Island should be cared for first, as special conditions exist there which call for immediate action. The demands of other sections are not to be wholly neglected. In the dry goods district of New York it is proposed speedily to instal a salt water plant which will cost \$885,000.

The Borough of Manhattan.

The report for the protection of the Borough of Manhattan was prepared by Nicholas Hill, chief engineer of the Bureau of Water Supply. Mr. Hill's report states in part:

The area outlined is bounded generally by Twenty-third street on the north, Broadway to Fourteenth street to Fourth avenue and the Bowery on the east, Chambers street on the south, and the North River on the west.

It is proposed to erect three pumping stations, definite locations for which cannot be fixed until the relative cost of land and other questions have been considered. Each station will be capable of pumping to any part of the distributing system. The subdivision of the pumping plant was deemed advisable on the ground that should any one station be disabled or rendered ineffective during the course of a conflagration two-thirds of the output of the plant, or double the present capacity of the fire department, would be available.

Provision has been made for direct connections to the high service mains at various points on the water front, so that in the event of the total disability of the pumping plant the fire boats may be used to pump into the proposed system. These boats, five in number, have a combined capacity of about 2,400,000 gallons per hour, or 40,000 gallons per minute, against a pressure of 150 pounds.

About 25 engines respond to a fourth alarm of fire in the district mentioned. Their combined capacity equals about 900,000 gallons per hour against a pressure of 125 pounds. The fire boats directly connected to the high service mains would more than double the output of the engines.

Capacity of Pumping Plants.—The present plans contemplate a capacity of 1,000,000 gallons per hour at each of the three stations, or a combined capacity of 3,000,000 gallons per hour. The pressure at the station will be 300 pounds. The minimum pressure at the hydrant is estimated at 200 pounds. The following facts are interesting: The new service will furnish more than three times the water now supplied at one fire by the present fire equipment. The pressure will be more than double that now maintained. Each station will furnish 32 streams through 3-inch hose with 1½-inch nozzles. Each hydrant will deliver approximately 2600 gallons per minute, or five such streams. Two hydrants are proposed for each street intersection, giving ten such streams. From the four corners of a block 40 such streams may be played on a fire within the block. Forty streams are equivalent

to about 20,000 gallons per minute, or 1,200,000 gallons per hour. About 33 1-3 per cent. more water can be delivered on a fire from the four corners of a block than is now furnished at a fourth alarm fire with the engines widely scattered. Concentration of the fire fighting force saves time and frictional losses in hose, and facilitates the operations of the officers and men. Ninety-six lines of 3-inch hose, not exceeding 350 feet in length, may be concentrated on a single fire when the three stations are operating simultaneously.

It has been proposed to put in a system for the combined purposes of fire protection and street cleaning. I consider this ill advised and impractical. The nominal pressure on the system is 300 pounds. The actual pressure may reach 600 pounds, due to water hammer and the presence of air in the mains. No hydrant can be built to withstand such conditions and undergo rough usage at the hands of ignorant workmen. The system might fail at a critical moment if used for other than fire purposes. Our experience with the hydrants on the low pressure service of the Croton amply justifies the above statement.

The pressures which will be carried on the fire service are too great for street cleaning. The city should provide proper stand pipes at street intersections, connected with the Croton system for the specific uses of the Street Cleaning Department.

Source of Energy.—Three sources of energy may be used—steam, gas and electricity. Steam need not be considered, unless absolutely necessary, on account of the high first cost of the plant and the expense of operation. The three stations will probably not be operated more than 240 hours per year. The plants, to be effective, must start instantly upon the stroke of a gong. Steam pressure must be maintained for every minute in the year to accomplish this in a steam plant. Fuel will have to be fed continually, therefore, to maintain stations operating ten days per year. This is not the case with gas or electricity if the energy is procured outside. A gas engine may be started in a few seconds, and when closed down is using no fuel. An electric motor may be started by throwing a switch, and the current shut off with equal facility. No final arrangements can be made for the supply of current or gas until the project takes more definite form.

A careful investigation leads me to believe the electric companies in Manhattan are amply equipped, so far as power is concerned, to give us the maximum amount of current needed at any time if properly constructed cables in duplicate are laid and interconnected to prevent a possible interruption in the supply of electricity. The three plants will require about 15,000 horse-power when working at their full capacity. The proposition from the gas company's standpoint is rather more difficult. To furnish the necessary gas involves long lines of mains not less than 30 inches in diameter. This entails heavy expense and special generators to insure the requisite amount of energy at any moment. The additional plant would create an annual expenditure of about \$50,000 per year for maintenance and repairs. This may be reduced on further investigation, but I have not considered it safe to figure on less than this amount in the estimate of the cost of operating a gas plant.

The cost of the electric current cannot be definitely ascertained until the conditions of operation and the locations of the pumping stations are determined. I have assumed a rate in the following estimates which I feel assured can be obtained. The load factor on the pumping station is small, as the stations are operated approximately ten days per year, so if electricity is paid for only when used the question of cost is not great in comparison with other expenses of operation and maintenance. The total cost, therefore, will not be materially affected by any reasonable change from the rates assumed. Allowance has been made for laying the necessary electric cables to connect the pumping stations. If gas is used the company will provide the pipes and plant.

Plan of Stations.—The mechanical efficiency of the gas and electric plants is approximately the same. In comparing the use of gas and electricity as the probable source of energy it may be well to present the following points in favor of electricity:

1. Economy in first cost of machinery and buildings.

2. Economy in space necessary for installation, thereby reducing cost of land required.

3. Economy in cost of wages, maintenance, repairs and renewals.

4. Simplicity.

The relative cost of power cannot be stated with accuracy until the price for which gas can be had is determined. Following is a statement of the comparative cost of one pumping station operated either by gas or electricity, an estimate of the probable operating expenses and fixed charges per annum, a similar summary for the three stations and an estimate of the total cost of high pressure fire service complete:

Cost of One Pumping Station.

	Electric.	Gas.
Number of units in station.....	4	6
Capacity in million gallons per hour....	1	1
Estimated number of hours plant will be in operation per year.....	80	80
Cost of motors and turbines, including piping, foundations, switchboard and wiring and cables.....	\$255,000
Cost of gas engines and pumps, including piping, foundations and auxiliaries, complete	\$448,000
Cost of buildings, foundations and land..	90,000	270,000
Total cost.....	\$345,000	\$718,000
Cost of wages per annum.....	7,850	18,150
Cost of gas per year.....	17,000
Cost of electricity per year at 4½ cents per kilowatt hour.....	13,200
Cost of oil, waste and supplies per year.....	300	300
Cost of repairs per year.....	2,400	3,600
Total cost of operation.....	\$23,500	\$39,050
Interest and depreciation.....	26,710	55,000
Refunding sinking fund.....	11,500	27,000
Total cost per annum.....	\$61,760	\$121,050

Cost of Three Pumping Stations.

	Electricity.	Gas.
Cost of three stations.....	\$1,035,000	\$2,154,000
Operating expenses and fixed charges per annum for three stations.....	185,280	363,150

Summary of Total Cost.

Pumping stations.....	\$1,035,000	\$2,154,000
Mains for distribution system, complete, with gate valves and hydrants.....	2,107,000	2,107,000
Telephone system.....	150,000	150,000
Total cost.....	\$3,292,000	\$4,411,000
Add 10 per cent. contingencies.....	329,200	441,100
Add 10 per cent. superintendence.....	329,200	441,100
Totals	\$3,950,400	\$5,293,200

Use of Fresh Water.—Careful attention has been given to the use of salt water in connection with its deleterious effect upon the contents of buildings. Salt water is more injurious to the hydrants, gate valves, pumps and distributing system than is fresh water. If salt water is used the depreciation on the plant will be increased. The plans submitted provide for both fresh and salt water connections at the pumping stations. The fresh water is drawn from the Croton system. This system is capable of supplying any or all the stations. In the event, however, of any shortage of supply of fresh water the salt water may be immediately used without interference with the operation of the plant.

In making the above modification I wish to emphasize that the original salt water system is not assailed or detracted from. The use of fresh water, with salt water available when needed, as suggested, removes one of the chief objections offered to the proposed service and adds thereby to the feasibility of the proposition.

The Borough of Brooklyn.

The report on the Borough of Brooklyn was by I. M. de Varona. It states in part: In this borough the districts in which the high pressure fire service can be advantageously installed are as follows:

Coney Island district, area about 147 acres; dry goods and high office building district, area about 575 acres; lower water front district, area about 845 acres; the section along the water front in the Eastern District, extending approximately from Division avenue to North Fourteenth street, and from the river front to somewhat beyond the line of Berry street, for which it may hereafter be advisable to make provision, area about 300 acres.

Coney Island District.—Special conditions, widely differing from those in any other district within the borough, exist here. The main buildings are valuable frame structures of moderate height, covering

the ocean front for a distance of approximately 3000 feet, and in case of fire it must be checked almost immediately in order to prevent a general conflagration; consequently the fire risk is great, as well as the difficulty of obtaining insurance. Furthermore, there are only two fire engines and one truck on the island, and within a period of 40 minutes after the fire alarm no more than six engines could be brought into service. The installation of a high pressure fire service here would, therefore, prove particularly advantageous, affording an instantaneous supply when needed, and this at a reduced expense, since the plant is to be operated by the regular employees of the sewage station, thus reducing the cost for salaries and maintenance, while the cost of installation of separate fire stations will also be saved. The pressure provided under this plant would be from 135 to 140 pounds at the hydrants, which would be more than ample for all fire purposes, in view of the small height of the buildings in that section.

Dry Goods and High Office Building District.—This district extends from Fort Greene place on the east to the river front on the west, and from Orange and Tillary streets on the north to Dean street and Atlantic avenue on the south. There will be two 20-inch mains with 16-inch extensions and 12-inch and 8-inch laterals.

Lower River Front District.—The boundaries of this district extend from the Erie Basin to the Navy Yard, with the exception of the portion included in the dry goods and high office building district, and is bounded in the southerly portion by Richards, Wolcott, Dwight and Columbia streets, Hamilton avenue, Hicks street, Rapelyea street, Henry street, Harrison street, Clinton street and Atlantic avenue. In the northerly section it is bounded by Tillary street, Navy street, East River and Doughty street, Hicks, Orange and Washington streets. The area of the northerly section is about 345 acres, and that of the southerly section about 500 acres, making, as previously stated, a total area of about 845 acres.

If a sufficient appropriation could be obtained, it might be advantageous to provide the water front, extending from Division avenue to North Fourteenth street, and from the river to somewhat beyond Berry street, with a high pressure fire system, but under present conditions it has not seemed necessary to further discuss this plan here. Should it be desired to extend the service to this district, the plan for the same can be readily prepared.

Pumping Stations, Number and Location.—For the Coney Island district, the location of the pumping station adjoining the sewage plant has such obvious advantages under the contemplated plan of operation that it has not been deemed necessary to discuss any other site. It will be free from danger of interruption of the supply due to conflagration in the surrounding area.

In determining the most favorable location and number of stations required for the river front and dry goods and high office building districts it was considered advisable to establish two stations—i.e., the main station at the foot of Joralemon street, and a reserve station, with two-thirds the capacity of the main station, at the corner of Willoughby and St. Edwards streets.

The station at the corner of Furman and Joralemon streets is not very favorably located to obtain either gas or electric power; but, on the other hand, it is centrally situated in regard to the system of which it forms a part, the supply of fresh or salt water can be readily and cheaply secured, the character of the surrounding buildings diminishes the probability of a conflagration which would cripple the station, and the buildings and lands to be acquired can probably be purchased at a comparatively small cost.

The reserve station adjoins on the north the fire department repair buildings; on the east it fronts on Fort Greene Park; to the south it fronts on Willoughby street, with Raymond street jail on the other side of the street, and to the west it adjoins a substantial brick factory. This location was deemed desirable on account of its particular freedom from risk from any large conflagration and the facilities to supply therefrom the river front and dry goods and high office building districts.

With two stations thus located there should be little

danger of interruption of the high pressure fire service from any cause.

Power and Engines.—Steam being obviously unavailable, the choice of the power to be used lies between gas and electricity, and much consideration has been given to their relative advantages. If the first cost and expense of maintenance and operation of the electric and gas plants were nearly alike, and the freedom from possible interruption of the service were also on a par, common prudence would dictate the equipment of the station with both electric and gas engines, thus minimizing the chances of a total crippling of the service, and I would have been glad to find that such an arrangement was practicable without incurring unwarranted expense. But the much larger cost of the gas plant and of the mains required to furnish that power to the station have compelled me to abandon the idea of having any gas engines at the main station and to recommend that both this station and the reserve station be entirely equipped with electric plants, relying for the protection of the service from interruption on two independent sources of supply and, to a certain extent, on the provision for a reserve station in addition to the main one. I had hoped that the Brooklyn Rapid Transit Company might also have agreed to furnish us electrical power, but in answer to my inquiry they stated that they were unable to do so. The electric power would be furnished by the Edison Company from the station located at the foot of Gold street, from which two independent underground feeders will carry the current to our main and reserve stations. The Gold street station is directly connected with the station at the foot of Sixty-fifth street, so that in case of a suspension of service at the Gold street station the current would still be furnished from the station at Sixty-fifth street, as well as that of the gas works from which gas could be furnished to our stations.

At the Coney Island station there will be three gas engines each of 150 horse-power. At the main station at the foot of Joralemon street there will be five electric motors of 750 horse-power each, and at the reserve station there will be three similar motors.

It is unnecessary to take into consideration the value of the electric current or gas used, since the main station would probably not be operated on an average more than two hours per month, and the reserve station might not be used more than one or two hours per year.

At the Coney Island station the gas supply is located within five blocks, while the nearest electrical power station is at the foot of Sixty-fifth street, 6 miles distant. At present there are only overhead feeders, which, over such a length, are liable to cause interruption of the service, although the Edison Company state that they will have underground feeders installed by the middle of May. Even under these conditions, however, owing to the small amount of power required at this station, it does not seem that the difference in cost in this case would outweigh the probable greater freedom from interruption of the service, especially as this difference would be decreased by about \$5000, which is the excess of cost of the electrical conduit and feeders which would have to be laid by the electric company over the meter which the gas company would install. Even if the chances of accident to the electric feeders when placed underground be considered slight, the nearness of the gas station almost precludes the chances of such an interruption, and therefore for this district I have adopted gas engines.

Pumps.—For the Coney Island station triplex plunger pumps will be used, as this type of pump will give practically a constant discharge and can be readily geared so as to be connected directly to the gas engine. If a turbine pump were used it would be necessary to connect by means of belting or chain drive, and the high speed would make this form of power transmission undesirable. For the required service three pumps will be installed having a capacity of 1200 gallons per minute each, or a total of 3600 gallons per minute, which is equivalent to a total of about 5,200,000 gallons in 24 hours.

At the main station at the foot of Joralemon street there will be five turbines, each having a capacity of about 2800 gallons per minute, which would be equivalent to slightly more than 20,000,000 gallons in 24 hours.

These turbines would be directly connected with and operated by electric motors, the speed of which would be the same as that of the turbines when running at their rated capacity.

At the reserve station there will be three such turbines of the same capacity and similarly connected, so that the capacity of this station will be slightly over 12,000,000 gallons in 24 hours, or somewhat less than two-thirds of that of the main station.

This combination of the electric motors and turbines is simple and comparatively inexpensive.

The mains will be of cast iron, with lead joints of special design. The mains, specials and hydrants will be tested at the foundries to a pressure of about 600 pounds, and when laid they will be tested to a pressure of about 450 pounds.

The Ambler Board Lift Drop Hammer.

Although the requirements for drop forgings have grown almost as exacting as those for small machined parts, the

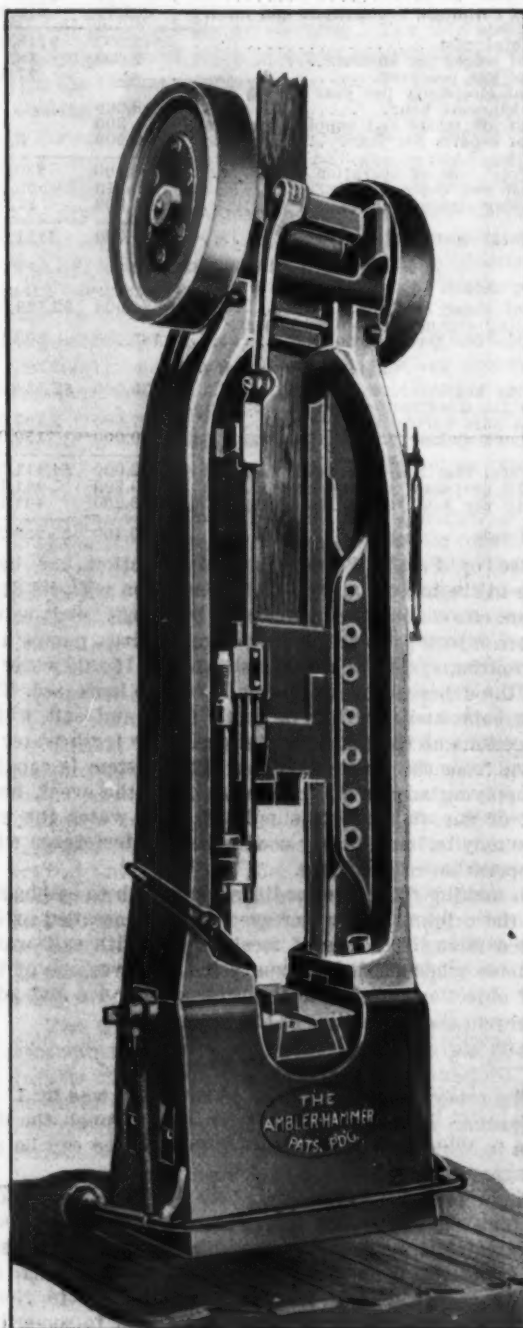


Fig. 1.—Working Side of the Hammer.

tools upon which they are manufactured have not improved as uniformly as have many other machine tools of less importance, and yet there are few machines in the shop that produce relatively the same ratio of output to investment as the drop hammer. The requirements for

accurate forging and the demand for the better preservation of the expensive dies prompted the Foos Mfg. Company of Springfield, Ohio, to undertake the construction of a hammer that would meet such special conditions. The hammer illustrated was designed by A. A. Ambler, superintendent for the Foos Company, and has been installed in the works of the International Harvester Company. From the start the hammer has been successful, producing a quality of work very close to gauge, and eliminating the troublesome shifting of the dies that in so many cases renders the work unprofitable.

One of the distinct features of the Ambler drop hammer is the manner in which the ways are joined to the anvil or base by a double lock joint, as shown in sectional views, A A and B B, Fig. 2. This has the form of a reversed dovetail, with a surface about 12 inches wide, and is rigidly bolted between the ways. Another dovetail joint shown at the top firmly grasps the lifter frame across its width of 18 inches or so, the whole being held together by large tie bolts having elastic washers on the outside under the nuts. This provision insures permanent alignment of the dies, and at the same time renders the joints sufficiently elastic vertically to withstand the

tive but easy action to the drop rod, entirely avoiding levers and similar complications. This construction requires no more attention in changing from a high to a low stroke than if the bumper was made of a solid steel block. It is recognized that in all friction roll hammers perfect control of the action of the hammer can only be obtained through the lifting board when it is entirely free from foreign substance, especially oil. In most hammers the construction of the lifter head is such that it is impossible to keep the oil necessary for the lubrication of the bearings from being thrown onto the board. On this hammer the bearings all have chambers holding the oil in check

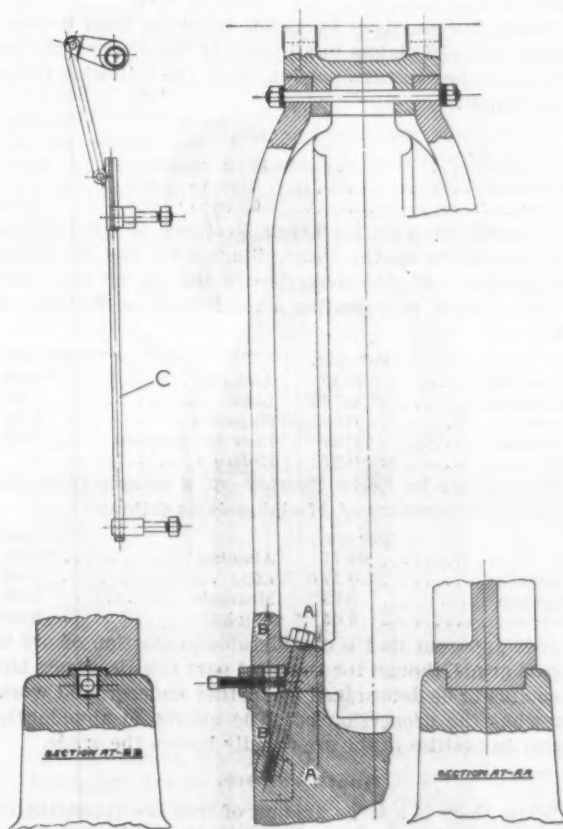


Fig. 2.

Details of Ambler Board Lift Drop Hammer.

repeated shock of concussion that must result from such hard service.

Another improvement is the jointed drop rod, C, Fig. 2, which, being held vertical, operates the eccentric positively. The automatic tripping mechanism, shown in Fig. 3, consists of the trip rod D, a steel latch, E, keyed to it, a tripping dog, F, adjusting collar, G, and torsional spring, H. When the hammer head drops the wedge shaped portion I engages with the dog F, turning the trip rod and latch sufficiently to release the drop rod so it can fall. The torsional spring H makes the drop rod D very flexible and sensitive at the top, and by means of the vernier spacing of the holes in the adjusting collar G almost any flexure of the trip rod D may be obtained. The tripping dog F is adjustable vertically on the trip rod, thus enabling the trip to be made at the most advantageous points, whether high or low dies are used.

An improved cushion bumper is provided on the hammer, which has proven by extensive tests to give a pos-

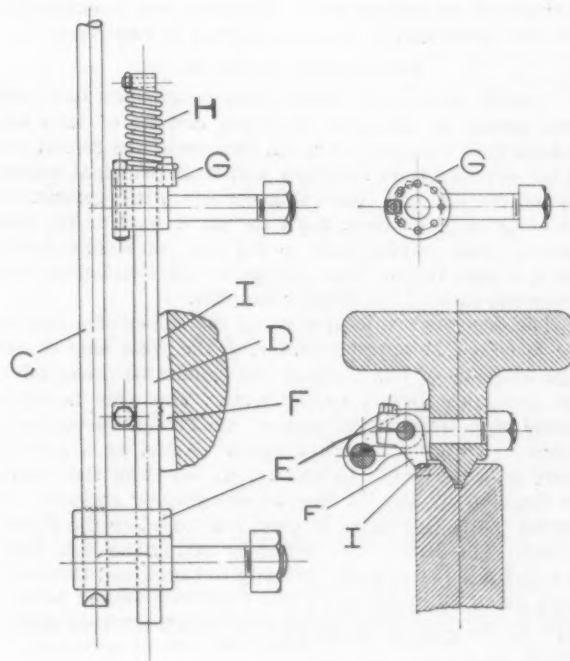


Fig. 3.

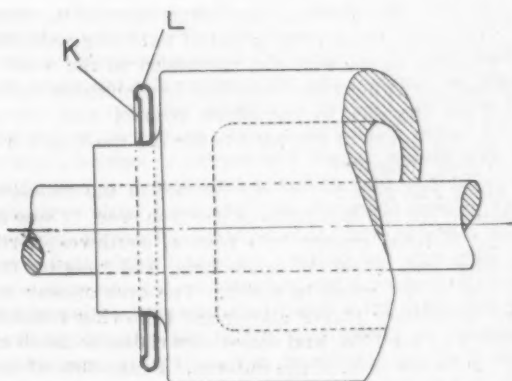


Fig. 4.

until required for lubrication, and in case any of it should escape it is forced to the end of the roll and by centrifugal force to the cavity L, Fig. 4, which is filled with wool or other absorbent material and retains it, preventing it from reaching the working surface of the roll or spattering onto the board.

It is well known that the board, being subjected to an excess of heat upon one side, will warp considerably, and if run in this condition eventually splits and soon becomes useless. This point has also been taken into consideration on the Ambler hammer, the board being so keyed into the hammer proper that it can be reversed, not only side for side, but also end for end vertically, greatly extending the life of the board.

These hammers are designed with a ratio of 15 to 1 between the weights of the anvil and the hammer head, and the metal is so distributed in the different parts of the hammer as to be entirely available up to the factor of safety employed.

The Iron Ores of Southern Utah.

United States Geological Survey Report on Iron Mountain District.

WASHINGTON, D. C., April 16, 1904.—A special report on the iron ore deposits of Southern Utah has just been completed by C. K. Leith of the United States Geological Survey, who, together with Oscar Rohn, a mining engineer from the Lake Superior region, made an examination of the so-called Iron Mountain district in the fall of 1903. Through the courtesy of Dr. C. W. Hayes, geologist in charge, the correspondent of *The Iron Age* is enabled to present the following advance abstract of this report:

Distribution of the Ore.

Iron ore deposits of considerable prominence have long been known in the Iron Mountain district of Iron and Washington counties, Utah, but because of the remoteness of the deposits from railways, and from principal coking, manufacturing and consuming centers, little general attention was given them until the latter part of the past decade, when developments in the iron and steel industry made it desirable to look outside of the well-known iron producing district for further supplies.

The deposits are located along the slopes of a spur of the Wasatch Mountains bordering the west side of the high plateaus of Utah, where the mountains break off to the Escalante Desert to the west. The area is represented on a topographic map of the Powell survey, published in Dutton's "High Plateau" Atlas, by a map by Putnam in the Tenth Census report based on the Powell survey, and by the St. George topographic sheet of the United States Geological Survey, also based on the Powell survey. The district is reached by taking the Salt Lake, San Pedro & Los Angeles Railway to Lund, and thence by stage about 22 miles across the Escalante Desert to Iron Springs and Iron City, adjacent to which the ores are located.

Sediments not markedly inclined from the horizontal, described as Lower Silurian by Newberry, are intruded by andesite. The andesite now forms cores of the foothills lying between the elevated areas of flat lying sediments of the Wasatch to the east and the desert to the west. The intermediate valleys are underlain by limestone and sandstone, but the rock in immediate contact with the andesite on the flanks of the hills is for the most part a pure, dense gray limestone.

Along and adjacent to the contact of the andesite and limestone are the exposures of the iron ores. These are in several isolated groups in a general southwest-northeast trending area about 18 miles long, and ranging from a few feet to 2½ miles in width. The ores appear in conspicuous narrow ridges and crags, following roughly the contours of the hills, and sometimes rising as much as 100 feet above the base of the outcrop. Fragments of the ore have fallen down the slopes, giving an impression that the ore occupies a larger area than it really does. In width the outcrops vary from a few inches to 600 or more feet, and have the shape of lenticular veins.

Nature of the Ore.

The ore appearing in the jagged exposures is a hard black crystallized hematite and magnetite, these minerals being present in varying proportions. The hematite tends to occur in botryoidal or mammillary forms and the magnetite in coarse octahedra, often with modified dodecahedral faces. Associated with the hematite and magnetite is chalcedonic and crystalline quartz, which has been deposited as vein material in numerous minute cavities, sometimes completely filling them, but more often not. The chalcedonic quartz is in characteristic dense, opaque, white gray, bluish or purplish masses, which in cavities present mamillary surfaces. Not infrequently the crystalline quartz has a purple color for a fraction of an inch immediately adjacent to the iron oxide. Well developed quartz crystals project into the cavities. Crystals of apatite occasionally penetrate the ore.

Much of the ore that has been reached by test pits and shafts, and especially that beneath and in immediate con-

tact with the limestone is a somewhat soft, earthy, red hematite, containing much magnetite. This may be well seen in one of the shafts of the Pinto group, and in numerous test pits on Desert Mound.

Analyses of the ore published in Lieutenant Wheeler's report on explorations and surveys west of the one-hundredth meridian and in Putnam's report in the Tenth Census indicate a content of metallic iron, ranging from 39 to 68 per cent. and of phosphorus commonly above the Bessemer limit. Commercial analyses made in recent years from samples carefully selected for the purpose of determining the composition of the ore in the large quantities in which it would have to be mined give for the most part results intermediate between the extremes above noted. Twenty-one analyses by Harry L. Brinker, each of them representing a considerable area, show a range in composition as follows:

	Per cent. Range.	Per cent. Average.
Iron, metallic.....	46.78 to 67.98	58.54
Silica	2.57 to 19.74	8.29
Sulphur	0.029 to 0.224	0.082
Phosphorus	0.029 to 1.134	0.185
Manganese	0.02 to 0.58	0.118
Lime	0.779 to 6.33	2.71
Magnesia	0.47 to 3.76	1.77
Copper	0.002 to 0.151	0.027

Ninety-five analyses by Lerch Brothers from average samples from 37 claims in all parts of the district, but especially in the southern portion, show the following range and average:

	Per cent. Range.	Per cent. Average.
Iron, metallic.....	48.32 to 69.50	58.96
Phosphorus	0.009 to 0.478	0.141
Sulphur	0.018 to 0.024	0.020

A fuller analysis by Lerch Brothers of all samples from the shafts on the Pinto, Blackhawk and Mountain Lion groups, with the exception of the top 30 feet from the Pinto shaft, representing a total depth of 291 feet, is as follows:

	Per cent.		Per cent.
Iron metallic.....	56.48	Alumina	1.08
Phosphorus	0.136	Lime	1.81
Sulphur	0.039	Magnesia	1.12
Manganese	0.27	Loss by ignition.....	3.02
Silica	0.67	Moisture	4

An analysis by Lerch Brothers of a sample from the magnetic ore outcrops of 17 claims is as follows:

	Per cent.		Per cent.
Iron	64.71	Alumina	0.88
Phosphorus	0.174	Lime	1.02
Manganese	0.23	Magnesia	0.80
Silica	5.65	Sulphur	0.020

It is apparent that a considerable proportion of ore is of good grade, though for the most part non-Bessemer, but it remains to be determined by further underground work just what the proportion is. The quartz so abundantly present in cavities in the ore rapidly lowers the grade.

Quality of Ore.

While there is a large amount of iron ore appearing in the exposed ledges and uncovered in pits, it is difficult to make quantitative estimates of the tonnage of ore of present commercial grade because of the variable composition of the ore above noted, and further because insufficient underground exploration has been done to show the depth of the ore and the extent to which it occurs in covered areas, and especially beneath the limestone.

It seems that there is a considerable quantity of high-grade iron ore present in this district which can be mined under favorable circumstances, and undoubtedly must be mined in the future, but it remains to be seen whether or not the conditions are such that profit may be derived from mining these ores at the present time. The nearest railway, the San Pedro, Los Angeles & Salt Lake Railway, running south from Salt Lake, passes about 22 miles west of the iron range. Parties interested in the ores are now discussing the feasibility of erecting blast furnaces and steel plant at Utah Lake or Green River. Recent coking experiments are said to have shown the existence of coal suitable for coking within a reasonable distance of these points. If this be true, the principal difficulty to be overcome is the securing of a market for the iron and steel products—a problem in which transportation is an important element.

W. L. C.

The Relation of Microstructure to the Rate of Cooling.*

BY W. CAMPBELL, NEW YORK.

When a molten metal or alloy is cooled down to its freezing point it begins to crystallize out, either as dendrites, grains or more or less well defined crystals. Upon the rate of cooling depends, in most cases, the resultant structure. If a metal passes through its freezing point very slowly its structure will be comparatively large; if rapidly cooled its structure will be fine. In the case of some metals and many alloys, however, other changes occur far below the freezing point, resulting in a rearrangement in the solid. Examples of such changes are seen in iron and steel, the bronzes and other alloys of copper and tin, the aluminum bronzes, and the alloys of copper and antimony.

In the case of iron and steel we are dealing with a single series of alloys as we pass from pure iron to steel, and finally to cast iron. Fig. 1 is based upon Roseboom's diagram (*Zeitschrift für Phys. Chemie*, 1900, Vol. XXXIV, p. 437), and shows the changes which take place with change of temperature and composition. The line A B marks the evolution of heat due to the crystallization of dendrites of iron, while B D corresponds to the separation out of graphite. At about 1100 degrees C. the dendrites or grains of iron can hold up to 2 per cent. of carbon in solid solution, and therefore between 0 and 2 per cent. carbon the alloys are solid solutions of carbon in iron and are called martensite. When more than 2 per cent. carbon is present, the graphite-martensite

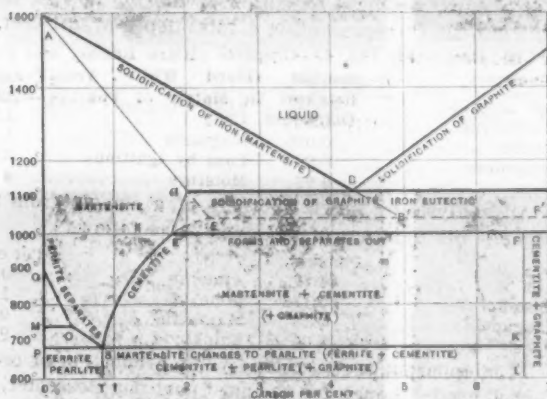


FIG. 1.

eutectic makes its appearance and surrounds the dendrites and grains of martensite as a ground mass. This is seen in Fig. 2, magnified 35 diameters. The alloy contains 2.9 per cent. C, 1.44 per cent. Si, 0.23 per cent. Mn. When the alloy cooled down to the temperature of the line A B the dendrites of martensite began to crystallize out and continued to grow, enriching the mother liquor in carbon, until at a little above 1100 degrees C. the latter contained about 4.3 per cent. carbon, when it solidified as alternate laminae of graphite and martensite. On the other hand, alloys containing more than 4.3 per cent. carbon would separate out graphite on reaching the temperature D B, while an alloy having the composition B, or about 4.3 per cent. carbon, would freeze out on reaching the point B as alternate laminae of graphite and martensite and would contain neither free martensite nor free graphite. Such an alloy is seen in Fig. 3, magnified 35 diameters. Thus the line A B C corresponds to the evolution of heat caused by the solidification of the graphite iron eutectic or ground mass. Below A a B C everything is solid. As the temperature falls the martensite can no longer retain 2 per cent. carbon in solid solution and we get graphite separating out along the line a E, thus reducing the dissolved carbon to about 1.8 per cent. at 1000 degrees C.

At 1000 degrees C. a great change in the solid tends to occur. The martensite (1.8 per cent. C.) is no longer in equilibrium with graphite and tends to react with it

to form carbide of iron, Fe₃C, called cementite. This reaction, however, is very slow and we usually find graphite below 1000 degrees C. But as the temperature falls a change occurs within the martensite itself, and this can best be explained by considering what happens in the alloys from 0 to 1.8 per cent. carbon, or the steels proper.

Steel.

In the case of steel, solidification begins when we pass the temperature marked by the line A B, and is complete when we reach A a. On the other hand, reheating to the neighborhood of A a causes burning, as Stansfield* has shown, due to a partial melting around the grains of martensite. Steels naturally fall into three divisions—those containing less than 0.8 per cent. carbon or S per cent.; those containing 0.8 per cent. carbon, and those with more than 0.8 per cent. carbon.

Steels with less than 0.8 per cent. carbon consist entirely of martensite above the temperature marked by the line G O S. As the temperature falls the martensite acts exactly as a liquid and on reaching the line G O S pure iron or ferrite separates out and enriches the remaining martensite in carbon, until at just below 700 degrees C. the residual martensite contains 0.8 per cent. carbon in solid solution. At this point, P S, recalcence occurs and the martensite splits up into alternate laminae of ferrite and cementite (or pure iron and the carbide of iron). The arrest in cooling produced by this transformation is known as Ar₁. Thus between the temperatures G O S and P S the steel consists of ferrite and martensite, while below P S it consists of ferrite and pearlite.

In the case of steels containing more than 0.8 per cent. carbon, as the temperature falls to the curve E S the martensite becomes supersaturated with cementite, which separates out on the curve E S and thus impoverishes the martensite in carbon until at the temperature S, as before, it contains 0.8 per cent. carbon, when recalcence occurs and pearlite is formed. Thus above E S the steel consist of martensite alone; between E S and the line P S K they consist of cementite and martensite, while below S K they consist of cementite and pearlite.

Lastly steel containing 0.8 per cent. carbon consists of martensite until it reaches the temperature S, when recalcence occurs and pearlite is formed. Thus we have neither free ferrite nor free cementite.

When a steel is quenched from a temperature above P S K the change from martensite into pearlite is partially or wholly prevented and the product is hard. The structure of martensite quenched from a high temperature is very similar to Fig. 13 and consists of grains with a peculiar striated appearance when etched. Of course, the higher the temperature to which the steel was heated above the change point P S K (called A_c on heating), the coarser the grain. Fig. 6, magnified 120 diameters, shows a steel containing 0.22 per cent. carbon slowly cooled from 1300 degrees C and consists of light grains of ferrite and dark patches of pearlite. Fig. 7, magnified 120 diameters, contains 1.17 per cent. carbon and was slowly cooled from about 1200 degrees C. It consists of veins and bands of cementite, round and in the dark mass, which is pearlite. In the one case, when the temperature reached a little over 800 degrees C. (G O) ferrite began to separate out and continued to do so until at about 690 degrees C. (or P S), when recalcence occurred and the residue was transformed into pearlite. In the second case, when the temperature reached about 830 degrees C. (on S E), cementite commenced to separate out around the boundaries and in the grains of martensite, while at about 690 degrees, or at S K, the residual martensite changed to pearlite. While Fig. 3 shows what is called the "eutectic" of martensite and graphite because it is the alloy which freezes at the lowest temperature, pearlite, or the steel with 0.8 per cent. carbon is called the "eutectoid" because it has nearly all the properties of a eutectic, but it does not freeze at the lowest temperature; it forms from the solid martensite at the lowest change point.

To return to our alloys of martensite and graphite. The martensite contains about 1.8 per cent. carbon in

* A lecture to the Philadelphia Foundrymen's Association, April 6, 1904.

* *Journal Iron and Steel Institute*, 1903, II.

solid solution; in other words, it is a high carbon steel and, therefore, as the temperature falls it becomes supersaturated with cementite, which separates out along the line E S until finally the residue has the composition S, or 0.8 per cent. carbon, when recalescence occurs and pearlite is formed. Thus our alloys should consist of martensite+cementite+graphite by lag within the area F E S K, and of pearlite+cementite+graphite by lag below the temperature S K, or 690 degrees C. Fig. 4 shows such an alloy, magnified 120 diameters. The black bands are graphite, while the hard white veins and patches are cementite, the whole being set in a matrix of pearlite. Had the specimens been quenched within the

but where martensite and cementite were. Hence we get a matrix of cementite and martensite, which subsequently rearranged itself into cementite and pearlite, as before. In the curve the line E' B' F' is taken to represent the solidification of the cementite-martensite eutectic. There can be no doubt that the silicon and the other impurities present play a most important part though their influence on the position of E' B' F' has yet to be exactly determined.

Alloys of Copper and Tin.

Coming next to alloys of copper and tin, we find that the series group themselves naturally into several di-

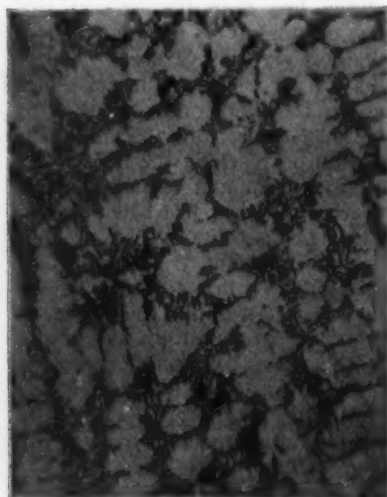


Fig. 2.—Martensite in Graphite-Martensite Ground Mass.—35 Diameters.



Fig. 3.—Alternate Laminae of Graphite and Martensite.—35 Diameters.



Fig. 4.—Graphite (Black Bands) and Cementite (Hard White Veins and Patches) in Matrix of Pearlite.—120 Diameters.

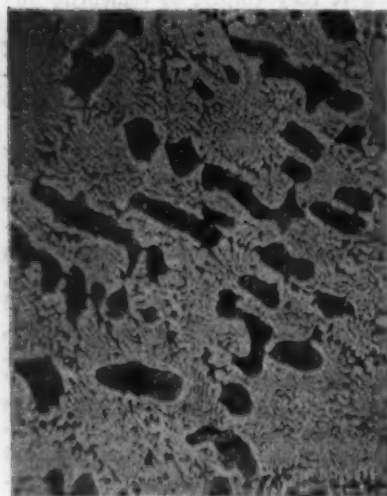


Fig. 5.—Washed Metal.—Ground Mass composed of alternate Cementite and Martensite.

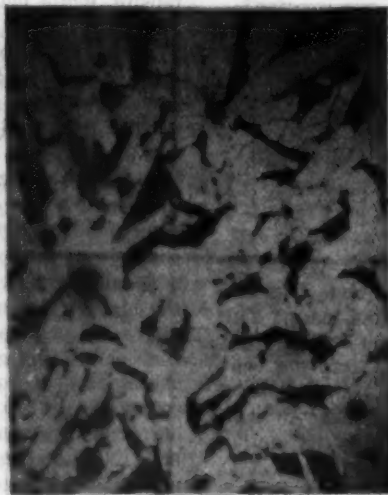


Fig. 6.—Steel, 0.22 Carbon.—Light grains of Ferrite and dark patches of Pearlite.—120 Diameters.



Fig. 7.—Steel, 1.17 Carbon.—Light veins and bands Cementite, dark mass Pearlite.—120 Diameters.

area F E S K, or between 690 degrees to about 900 degrees C., we should have had graphite and some cementite set in a ground mass of martensite and therefore a hard alloy.

White Cast Iron.

Coming next to white cast iron, we find that instead of having martensite set in a matrix or eutectic of graphite and martensite, the ground mass is composed of alternate cementite and martensite. This is shown in Fig. 5, magnified 35 diameters, which is a piece of washed metal, 3.5 per cent carbon. The dendrites of martensite have, in cooling, rearranged themselves into cementite and pearlite as before. Crystallization occurred exactly as in case of Fig. 2, excepting that the ground mass or eutectic solidified at a temperature where martensite and graphite were not in equilibrium,

visions, according to their curves and microstructure. Three compounds occur—viz.: SnCu_2 , SnCu , and SnCu , which, with copper and tin, make five constituents, whose relations have been excellently shown by Heycock and Neville.*

1. Between 0 and 1 per cent. copper, grains and dendrites of tin are found in increasing amounts of the ground mass or eutectic of tin and SnCu . The type of the structure is shown in Fig. 2.

2. Between 1 and 8 per cent. copper, bright, hollow, rod like crystals of SnCu , which tend to form three-rayed stars, are found in the eutectic. Their shape can be seen in Fig. 8.

*3. Eight to 61.8 per cent. of copper. When the copper in the alloy reaches 61.8 per cent. we have the mass made

* Phil. Trans. Royal Soc. A., 202, pp. 1-60.

up entirely of the second compound SnCu_2 . Below 400 degrees C this is not stable, but will react with any free tin present to form SnCu , the lower compound. As in the case of graphite and martensite so here, the reaction is usually incomplete, and so within this group in the slowly cooled alloys we find SnCu_2 , SnCu and the eutectic existing together. Fig. 8, magnified 35 diameters, shows the 20 per cent. copper alloy, very slowly cooled in furnace. Three constituents can be seen. In the lower part of the figure the centers of the bright crystals consist of SnCu , by lag in the reaction, because they have been isolated by envelopes of the bright white compound SnCu , which is also seen in upper part of the figure. The ground mass consists of laminae of tin and CuSn .

the eutectoid of SnCu , and copper. The alloys solidify at about 770 degrees C. as a homogeneous solid solution as before, like martensite. As the temperature falls this becomes supersaturated with SnCu , which crystallizes out of the solid from about 580 to 490 degrees, when the residual solid has the composition of 75 per cent. copper and breaks up into the eutectoid just as martensite changed to pearlite in the case of iron and steel. Hence this series is comparable to steel from 1.8 to 0.8 per cent. carbon.

6. Seventy-five per cent. to 100 per cent. copper. As the copper in the alloy is increased above 75 per cent. dendrites of copper make their appearance and increase with the total copper until between 90 and 95 per cent.



Fig. 8.—Copper-Tin Alloy.—20 per cent. copper. Slowly cooled in furnace.



Fig. 9.—Copper-Tin Alloy.—20 per cent. copper. Cast as small ingot.



Fig. 10.—Copper-Tin Alloy.—80 per cent. copper. Slowly cooled.



Fig. 11.—Copper-Tin Alloy.—80 per cent. copper. Quenched from just under 800 degrees C.



Fig. 12.—Aluminum-Copper Alloy.—88 per cent. copper.



Fig. 13.—Aluminum-Copper Alloy.—88 per cent. copper. Reheated and quenched.

Fig. 9, magnified 35 diameters, shows the same alloy when cast as a small ingot. Here we see the difference between slow and rapid cooling, when we compare the structure with that of Fig. 8.

4. From 61.8 per cent. to 68.2 per cent. we pass from SnCu_2 to the compound SnCu , or speculum metal. The alloys solidify at about 740 degrees C. as a homogeneous solid solution akin to martensite. At a lower temperature this solid solution becomes supersaturated with SnCu , which crystallizes out from 660 degrees down to about 580 degrees C., at which temperature the remainder has a composition 68.2 per cent. Cu and changes over to SnCu . Both these changes take place in the solid.

5. From 68.2 per cent. to 75 per cent. copper, in the slowly cooled alloys, we find decreasing amounts of the compound SnCu , in the form of rosettes and veins set in

copper they occupy the whole mass. In other words, copper holds between 5 and 10 per cent. copper in solid solution. The ground mass consists of the eutectoid, which solidifies at 790 degrees C. as a homogeneous solid solution, but at a lower temperature (500 degrees C.) rearranges itself into alternate laminae of copper and SnCu . Fig. 10, magnified 35 diameters, shows the alloy containing 80 per cent. copper, slowly cooled, and consists of dark dendrites of copper set in the lighter eutectoid. Fig. 11 shows the same alloy which was quenched from a temperature just under 800 degrees C. It consists of light dendrites of copper set in a homogeneous matrix which is the solid solution from which the eutectoid forms at 500 degrees C., when slowly cooled. The difference in color of the copper dendrites in Figs. 10 and 11 is due to difference in etching.

Alloys of Copper and Aluminum.

Lastly, in the case of the alloys of copper and aluminum we find similar changes in the solid state. According to Le Chatelier, three compounds occur: Al_2Cu , AlCu and AuCu .

Between pure aluminum and 54 per cent. copper we have a simple series of alloys, with the eutectic at about 32 per cent. copper. In other words, from 0 to 32 per cent. Cu we find grains and dendrites of aluminum in increasing amounts of the eutectic alloy which freezes at about 530 degrees C.; from 32 per cent. to 54 per cent. Cu, the compound Al_2Cu is found in decreasing amounts of eutectic. Figs 2 and 8 may be taken as resembling the two-type structures. Between Al_2Cu and AlCu (?) we find the latter surrounded by decreasing amounts of the former, until the mass again becomes homogeneous. With further increase in copper a eutectoid makes its appearance and increases until the whole mass is composed of it. As the copper is again increased bright grains and needless of AlCu , make their appearance, as in Fig. 12, magnified 35 diameters, which contains about 88 per cent. copper. From about 90 per cent. copper onward the series is composed of isomorphous mixtures of AlCu , and copper. The change in the solid in the alloys from about 80 per cent. copper to 90 per cent. is the same as that found in steel and in the bronzes. The alloys set as a whole in the form of a solid solution like martensite and afterward rearrange themselves into the compound in excess and the eutectoid. This is easily shown by reheating any of them to a red heat and quenching. Fig. 13, magnified 35 diameters, shows the same alloy as Fig. 12 reheated and quenched. The change in structure is very pronounced. If reheated and slowly cooled the original structure is restored.

Thus it will be seen that in the case of iron and steel and other alloys changes occur far below the freezing point, that these changes partially or entirely obliterate the structure due to the original crystallization and are therefore of the utmost importance, for upon the structure, in a great measure, the physical properties depend.

The Union Rail Company.

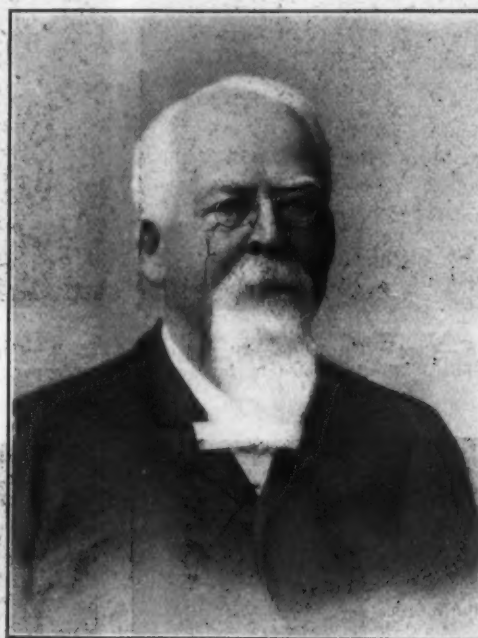
The mills of the Union Rail Company, at Huntington, W. Va., were placed in operation on April 11, rolling light steel rails. The plant was formerly owned by the Huntington Tin & Planished Plate Company, contained two hot mills and one cold mill, and was purchased in August, 1903, by A. F. Baumgarten & Brother, Farmers' Bank Building, Pittsburgh. The sheet mill equipment has been entirely removed, and will not be used in the new plant. A new 18-inch bar mill has been added, built by the George A. Hogg Iron & Steel Foundry Company, Pittsburgh. The rolls and guides for rolling steel rails were designed under the personal supervision of A. F. Baumgarten, and embody a number of improvements over the methods formerly used by Mr. Baumgarten in other plants. The main engine is 32 x 48 inches, high speed, built in St. Louis. The continuous furnace is 30 x 18 inside measurement, is heated by natural gas, and is operated by pneumatic pushers. The conveying tables were designed by Mr. Baumgarten and built by Heyl & Patterson, Pittsburgh. The plant is located on three railroads. The capacity is about 150 tons of light rails per day, running double turn.

Walter S. Wood, president of the Cutter, Wood & Stevens Company, Boston, Mass., and their ex-molder representative of their Providence branch of foundry supplies, were in Albany and surrounding counties last week and purchased all grades of molding sand to the extent of about 740 acres, which they are now supplying to the trade.

Canada's aggregate foreign trade for the nine months ended March 31 amounted to \$345,307,651, or \$14,832,238 more than for the same period of the year previous. This includes coin and bullion. The imports totaled \$175,523,712, as against \$155,440,036 last year, and the exports amounted to \$155,064,155, as against \$162,420,763.

Andrew M. Watson.

Andrew M. Watson, one of the oldest and at one time one of the most prominent men in the American steel trade, died in Philadelphia on April 13, aged 81 years. Mr. Watson first became identified with the steel trade in 1849 with Wilson, Hawksworth & Ellison, an old Sheffield firm, with offices in Philadelphia, on Commerce above Fifth street. Shortly thereafter he was invited to visit England by Joshua Moss & Co., at that time the largest manufacturers of bar steel in the world, and was made the American representative of this firm, with warehouses at Fifth and Commerce streets. Moss & Gamble succeeded Joshua Moss & Co., Mr. Watson continuing as their representative in this country. He was the first American citizen who ever directly represented English steel interests in this country. He became the most widely known man in his line of business in the United States, possessing the confidence and respect of consumers from ocean to ocean. In 1865 or 1866 he opened a branch house for Moss & Gamble at 80 John street, New York, personally directing the business in



ANDREW M. WATSON.

both cities. In 1878 he became the general sales agent for the Midvale Steel Company, with warehouses on the southwest corner of Fifth and Commerce streets, where he remained until his retirement from active business life in 1892, thus rounding out a continuous business career of 42 years in Commerce street. Mr. Watson in the course of his business life crossed the ocean some 20 times, and was as much respected abroad as he was at home. Toward the end of his career he became known as "the grand old man of the steel trade." Since his retirement in 1892 he resided during the winter months at his home in Philadelphia, spending the balance of the year at his Atlantic City residence. He is survived by his widow, four daughters and three sons. One of the sons is S. Ashton Watson, general sales agent of the American Steel Foundries, 74 Broadway, New York; another is Chas. P. Watson, in the banking and brokerage business; and the third is Wm. F. Watson, district sales manager of the company of whom his elder brother is head of the sales department. Mr. and Mrs. Watson celebrated their golden wedding anniversary nine years ago.

The Canadian commission to investigate electric smelting of iron and steel arrived in New York from Europe on the 15th inst., en route for Ottawa, where they are now preparing a report of the investigation which they have made.

National Metal Trades Association Notes.

CINCINNATI, April 18, 1904.—Week before last Commissioner Du Brul was in Chicago and Joliet, and from there went to Milwaukee and Oshkosh. District committee meetings were held in Milwaukee and Chicago, and affairs discussed relative to those districts. Last week he was in Washington, where he appeared against the arbitration bill. Both laborers and employers are against this bill, and it seems that the only people pushing it are public spirited gentlemen who have no direct connection with labor troubles. At Baltimore objection was taken to a new shop rule at the Detrick & Harvey Machine Company. A few of the men quit work, but their places were soon filled by others. At Philadelphia he inspected the new labor bureau recently opened by the Metal Manufacturers' Association, of which Mr. Falkenau, member of the administrative council, is president. This bureau is in very good shape, under the able management of the secretary, D. H. McPherson, former solicitor of the National Association. All the Philadelphia firms in the association are getting their help through the bureau. From thence he went to New York and attended the regular monthly meeting of the New York Metal Trades Association, which he found in good, healthy condition, under the able direction of Commissioner Hunter.

Some of the students of a Western college have named the National Metal Trades Association *Bulletin* the Bible on the labor question.

Several weeks since mention was made of a strike among the Fisher & Davis Company's employees, St. Louis, Mo. A brief *resumé* as to the cause is as follows: The first demand of the business agent of the machinists' union was that a force of men recently employed on the night shift should receive the same wages as the day men doing the same class of work. Some of the employees on the day shift have been working for the company for a number of years and were, of course, worth more money than new men. The demand made by the business agent was refused. A complaint was then made to the association that the Fisher & Davis Company had violated a section of the agreement existing between the St. Louis Metal Trades Association and the International Association of Machinists, District No. 9. In order that the dispute might be fairly considered and justice done to both sides, a special meeting of the Executive Board was immediately called to which a committee representing the machinists was invited. The sum and substance of the demand of this committee was for a minimum scale of 30 cents per hour. This was, of course, flatly refused, as this association does not recognize any minimum rate of wages, that question being left entirely with the individual employer and employee. However, an arbitration committee of three was appointed to confer with an arbitration committee from the machinists' union. This committee held a meeting on March 11, at which time it was arranged to hold another meeting on March 14, both sides agreeing that no decisive action should be taken until after that date. Notwithstanding this agreement an agent of the union visited the shops of the company between 11 and 12 o'clock on March 11, during the absence of members of the firm, and at midnight the night shift quit work. On March 12 the day force at starting time took their tools and left the shop. The agreement made by the St. Louis Metal Trades Association with the machinists' union (and which does not expire until May 20, 1904,) has an arbitration clause stating that there shall be no cessation of work pending arbitration or conciliation. The action of the men in going out on strike was immediately reported to the association, and a meeting of the Executive Board was held at 12 o'clock on March 12. A committee of five was then appointed by the Executive Board to act for the association during the strike, and this committee met regularly every day at 1 o'clock, and not only directed the work of filling the shop, but kept the members fully informed as to the progress of the strike by daily bulletin.

The Fisher & Davis Company notified all of their striking employees that unless they returned to work by noon, March 14, their positions would be declared vacant and steps immediately taken to fill the same. As the men did not return to work at the expiration of the time limit,

other mechanics were sent from the employment department of the association to take their places. The shop was picketed continually, there being from five to fifteen pickets constantly on duty. A few of the men were drawn out from time to time, but their places were quickly filled, and the pickets had very little effect on those who were working in the shop. On March 23 a committee representing the former employees asked for and were granted an interview. This committee stated that they were desirous of returning to work, but asked that the men working there during the strike be discharged. Their request was refused. On March 24 the men asked that they be allowed to return to work unconditionally. They were told that those working on the day shift could return, but none of the men working on the night shift were re-employed. The day men returned to work on March 25. The strike lasted ten and a half days, the latter eight days of which the shop was running continuously. It is worthy of note, showing the discipline of the members of the St. Louis Metal Trades Association, that no members of the emergency committee were absent or tardy at any of the daily meetings of the committee, and all the recommendations of the committee were strictly adhered to by the large membership of the convention.

There have been several disputes during the year between the St. Louis Metal Trades Association and the unions with whom agreements have been entered into, showing a discouraging lack of respect on the part of the unions for the letter and spirit of their agreements.

The National Machine Tool Builders' Association.

CINCINNATI, OHIO, April 19, 1904.—(By Telegraph.)—The National Machine Tool Builders' Association will hold their regular meeting at the Grand Hotel, this city, on April 26. Arrangements are being made to the end that this shall be one of the best in the history of the association. Prominent machine tool men are preparing papers, the subjects of which at this writing we are unable to learn. Mr. Montannus, the secretary, will address the convention on a review of the work of the association and the advantages of being a member. The banquet, which will be served in the spacious dining rooms of the Grand Hotel, will take place on the evening of the 26th, and will be in charge of the Committee on Entertainment. Philip Fosdick will be the toastmaster, and an enjoyable evening is guaranteed all who attend.

Follansbee Brothers Company's New Plant.

With the advent of good weather, active operations have been started looking to the completion of the tin plate and sheet mill plant which has been in course of erection for some months by Follansbee Brothers Company, Pittsburgh, at Mahan Station, on the Panhandle Railroad, near Wellsburg, W. Va. This plant will contain when completed six sheet mills and two tin plate mills, and it is expected to be ready for operation about August 1. The hot mill building is under roof and is 60 x 440 feet, with a 30-foot lean to running the entire length of the building. This building will be commanded by a 25-ton electric crane. The cold mill building, 70 x 475 feet, is commanded by a 10-ton electric crane, having a 5-ton auxiliary hoist. The tin house is 70 x 470 feet, and will be equipped with duplex tinning sets of modern design. The boiler house will be equipped with 2000 horse-power boilers.

It is intended to make this a modern plant throughout, the buildings being of heavy construction and the equipment of the very latest design. The superintendent of the plant is William Banfield, formerly of the firm of Wallace, Banfield & Co., tin plate manufacturers at Ironton, Ohio, but more recently one of the district managers of the American Sheet & Tin Plate Company, but who resigned this position some time since to engage with Follansbee Brothers Company. The output of the plant will be handled exclusively by Follansbee Brothers Company, who are large jobbers in tin plate, sheets and other metals, having large warehouse and offices at Liberty avenue and Short street, Pittsburgh.

The Iron Age

New York, Thursday, April 21, 1904.

DAVID WILLIAMS COMPANY,	- - - - -	PUBLISHERS.
CHARLES KIRCHHOFF,	- - - - -	EDITOR.
GEO. W. COPE,	- - - - -	ASSOCIATE EDITOR.
RICHARD R. WILLIAMS,	- - - - -	HANDWRITER EDITOR.

To Improve Currency Conditions.

Mr. Hill's very modest bill to improve currency conditions, introduced last November, has been curtailed by the Committee on Banking and Currency, and in its abbreviated form has been favorably reported to the House. But as five months have been spent in reducing the dimensions of the bill, and the adjournment of Congress is believed to be near, it is evident that no attempt will be made to pass it.

The report, which is made by Mr. Fowler, because Mr. Hill was left off the committee in the reorganization of the House in December, discloses two illustrations of the futility of legislative interference with the issue of currency. One case has already received considerable attention. It is that of the law permitting not more than \$3,000,000 a month of lawful money to be deposited for the redemption of bank notes. The committee recommends the repeal of this, and says truly, and guardedly, that the repeal "will give to our national bank circulation all of the elasticity which it is possible for a bond secured circulation to have." This limitation, imposed in 1882, was intended to prevent the banks from contracting the circulation, which many persons supposed they were likely to do for the purpose of "cornering money" and increasing rates. The report cites the fact that the average bank circulation for 15 years after this restriction was imposed was \$84,000,000 less than for 15 years before. It did not prevent the contraction of the currency due to the high price of bonds, but, on the contrary, it prevented the expansion of the circulation when there was a temporary need for a greater volume, because banks were not willing to meet a temporary demand for more notes when they could not reduce their circulation as soon as the emergency was over. Secretary Shaw says that in the severe stringency of 1902 he could have induced the banks to put out \$50,000,000 of additional circulation if it had not been for that restriction.

The other case is not so well known. The act of March 14, 1900, provided that not more than one-third of the issues of any national bank should be in \$5 notes. The original proposition was to put an end to all \$5 bank notes in order to create a demand for silver certificates. Banks protested, and by way of compromise they were allowed to have one-third of their notes in that convenient denomination. The committee says that the unwillingness of small banks to pay for two plates has resulted in their not issuing fives, while the banks which are willing to issue notes of that denomination cannot exceed the limit of one-third. The Comptroller's report shows that the percentage of bank circulation in \$5 notes has decreased from 31.2 per cent. at the passage of the act to 14.8 per cent. at the end of last October. Instead of \$144,000,000 in fives, there were on April 1 only \$61,000,000. The demand for \$5 silver certificates to take the place of bank notes has created a scarcity in ones and twos, while the employment of "greenbacks" as bank reserves has created a scarcity of tens.

The committee reports favorably on the proposal of the bill to allow gold certificates to be issued for \$10.

the present minimum being \$20, and to allow banks to issue as much of their circulation in fives as the convenience of their customers requires. There is also a scarcity in subsidiary silver, and the question has been whether additional coinage should be struck from silver bought for the purpose or from the idle silver in the vaults. The bill provides for the latter, and the report quotes Secretary Shaw's statement that "500 carloads of coined silver dollars, the metallic value of which is less than 40 cents, supported by an act of Congress requiring the Secretary of the Treasury to maintain the same at par with gold, suggests the prudence of reducing the amount whenever it can be done without disturbing existing financial conditions."

The bill would allow customs collections as well as other public revenues to be deposited in national banks, as there has been no reason for the discrimination since the Government ceased to depend upon the payment of import duties for the means of paying gold interest on its bonds. The original bill proposed to confer on the Secretary of the Treasury authority to replace any United States notes and silver certificates with corresponding notes and certificates of other denominations, but the committee struck this out, and it also struck out Mr. Hill's provision making the tax on circulation 0.5 per cent. a year, whatever bonds were used as security for notes. The committee prefers to retain the present discrimination in favor of the 2 per cent. bonds.

The deposit of customs collections in the banks, the removal of the restriction on the amount of bank notes that may be retired in any one month, and a better supply of small bills and silver change, is as far as the committee is willing to go now, and the indications are very strong that Congress will not go at all.

Flexibility of Production.

Ordinarily speaking, the production of any manufactured article varies in fairly close conformity with the demand. If trade diminishes, factories reduce their output or suspend operations. Stocks are not accumulated much beyond normal requirements of the trade, as too much capital would soon be locked up and profits placed in jeopardy. If trade increases, efforts are made to keep pace with the heavier demand, not only by running overtime, but by the building of new works. It is a comparatively simple matter to increase production rapidly with the high development of mechanical facilities which marks the current era. If the demand grows abruptly for some special article or class of articles, a measure of scarcity may be precipitated, but it will not be protracted. An instance of this character was the sharp demand for oil and gas stoves in the fall of 1902, when the strike of the anthracite coal miners caused a serious shortage of solid fuel throughout a considerable section of the country, and people were forced to resort to the use of cooking and heating apparatus burning liquid and gaseous fuel. Stocks of such stoves were quickly exhausted and manufacturers were driven almost to their wits' end in the endeavor to meet the emergency. But the extraordinary efforts made to reap the unexpected harvest were crowned with such success that the production expeditiously caught up with the demand and probably could have supplied a still heavier trade if it had continued to grow. The same ability to adjust itself to a sudden expansion in the demand may be seen in every other branch of manufacturing in which increased production simply depends upon the purchase of standard machinery and the assemblage of staple materials. It seldom happens that American manufacturers are unwilling to take the risk of in-

vestment in additional plant for the purpose of catching a trade which may not be permanent. An example of their enterprise in this respect was the bicycle industry, which attained phenomenal development, but which long before that time had been regarded by conservative business men as a precarious commercial proposition.

Expansion of manufacturing facilities for the production of iron and steel is a much more serious undertaking than the fabrication of iron and steel into articles for general use. A blast furnace capable of holding its own in the fierce competition of these days must be equipped with expensive appliances, and be well fortified as to a supply of raw materials, which means the investment of a heavy capital. A steel plant must likewise be built with a very liberal expenditure of money, and be backed by a capital ample to meet all contingencies. The investment of the great sums of money necessary to put such plants in producing condition presupposes their steady operation for the purpose of assuring satisfactory returns on their cost. It is much more desirable and apparently necessary that such enterprises as these should run steadily than factories working raw iron and steel into other forms. The partial closing of a factory means much less than the blowing out of a blast furnace or the stoppage of a steel plant. Yet in even these lines a quick response is made to any change in the character of the demand. The flexibility of iron and steel production is and always has been a remarkable feature of the trade. No other industry, perhaps, is subject to such great vicissitudes. While the prayer of the iron manufacturer from time immemorial has been for stability in the demand, his experience has invariably been that it is most unstable. If buyers begin to exhibit a tendency to purchase more freely, and cheerfulness pervades the trade, the disposition to purchase increases until a speculative spirit is induced which so excites all consuming interests that increasing pressure to buy is shown and prices go soaring. On the other hand, so ingrained is the belief in reverses in the iron trade that as soon as prices cease to advance the consuming interests grow overcautious and refuse to purchase until either their necessities compel them to enter the market or prices recede to an attractive level.

It is remarkable that an industry involving so many complications as the pig iron industry can so quickly adapt itself to these changing conditions. Within the past year we have had a most interesting exemplification of the flexibility of this trade. Until June the production was up to the utmost capacity of the furnaces, and it was impossible to accumulate any stock. But seldom, if ever, was such an abstention from buying seen as in the last half of the year, taking into consideration the extraordinary activity of the opening months. Production was at once reduced, and by the close of the year the output was clearly under the consumption, as evidenced by the rapid recovery early in the present year after consumers began to regain confidence. Especially noteworthy is the ease with which the output increases as the demand grows.

A Weak Point in Trust Control.

The so-called trusts or consolidations have many points of strength, as, for instance, in economy in manufacture, in increased buying power and in diminishing ruinous competition. As a machine for buying raw materials and making and selling finished products the modern trust is theoretically correct. But the personal element is often neglected, as it is in other manually operated machines. And here lies the rock on which some trusts have been wrecked and others are likely to be.

John Smith starts in a manufacturing business, with

relatively small capital; but by dint of hard work and careful attention to details he builds it up step by step until he has representatives all over the country, enthusiastically and earnestly pushing the Johnsmith line. They know John Smith and his history. They are proud of his achievements. They feel that nothing is turned out of his factory that has not received his personal sanction. They get letters from John Smith, commending them for good work done or berating them for mistakes. The letters are full of good advice and safe counsel. They see John Smith when they go to headquarters, and personal touch with him only heightens their enthusiasm. They feel that he has an interest in them, and they reciprocate loyally.

Smith eventually sells his business out to a trust, in which Brown, Jones, Robinson and a half dozen other manufacturers, whose product Smith's salesmen have been taught to believe is inferior to Smith's, are included. Smith is made vice-president of the concern, and they never hear from him again. Instead, they receive instructions signed by the consolidation and countersigned in unrecognized initials. It possibly becomes evident that the man with the initials, who attempts to give them instructions, does not fully comprehend what he is talking about. Yet his letters are couched in such authoritative language that they fear to disobey even the most absurd commands, though they may know that it is business suicide to obey. In time they visit the home office and meet the man with the initials, to find, perhaps, that he is a callow youth—possibly a nephew of the president—who knows nothing about the trials of a salesman or branch office manager, and but little about the merits of the goods.

Loyalty is an inherent trait of character, and it is developed more strongly in salesmen than in any other class of employee, because salesmen are called upon to sing the praises of their goods and the makers of them so often and so earnestly that they come to idealize both the goods and the man who makes them. And it requires repeated rebuffs, repeated disappointments, to destroy this loyalty and enthusiasm, particularly when the goods that they sell are made by a man whom they know personally.

There can be little doubt that the collapse of the "bicycle trust," so-called, was partly due to the loss of this element of enthusiasm on the part of agents and dealers who had persuaded themselves that the particular wheel they were handling was better than the rest; and, further, the chilling of the enthusiasm of the rider himself, who always spoke the name of his mount with conscious pride.

The personal factors of the selling equation cannot be ignored and the consolidation that neglects the personality of the salesman on the fighting line is sure to suffer. Rather should consolidations seek the more earnestly to foster the loyalty and pride of the salesman, because the formation of the trust will make his labors all the more difficult, as the average buyer has been educated to the belief that every order he gives to a trust or combination fosters monopoly and decrease his power to buy advantageously. Even though the combination maintains as high a standard of excellence in its product as the best product of the best constituent company—which is not apt to be the case—it will be hard for the salesman to convince the buyer that such is the fact.

Absentee management or control is as distasteful to the business man of to-day as it was to King George's subjects in America when they rebelled against the acts of his governors and emissaries, and it calls for a high order of diplomacy on the part of the sales manager to keep his men keyed up to concert pitch.

The Southern Supply and Machinery Dealers' Association.

Members of the Southern Supply and Machinery Dealers' Association and manufacturers from all sections of the country whose products they distribute throughout the South met at Old Point Comfort, Fortress Monroe, Va., last week to improve their acquaintance socially and talk over business topics of mutual interest. The occasion of the gathering was the third annual convention of the supply and machinery dealers, and the very large attendance bore testimony to the extremely flattering growth of this young organization. The large number of manufacturers and their representatives present indicated that the producers in the North, East and West are following with keen interest the growing prosperity and attendant increasing consumption of the South. The meeting was a most enjoyable one from every standpoint. In the first place, the meeting place itself, with its many interesting and historic surroundings, invited a holiday spirit. That the members and their guests came fully prepared to give this spirit of freedom full sway was evidenced by the large number of ladies who accompanied them.

With the exception of the opening session, when all in attendance were invited to be present, and the session of Wednesday afternoon, at which both dealers and manufacturers conferred, the deliberations of the association were held behind closed doors. The doings of these strictly executive sessions were of such a nature as to interest the members of the organization alone, or at least were of sufficient importance to prohibit publicity, as all information concerning them was withheld from publication. They dealt chiefly with the main problem before the association, which is that of fortifying the position of the jobber so that all goods going from the manufacturer to the consumer shall pass through his hands. In this connection it is interesting to note the policy of the association, which is as follows:

The object of this association shall be the promotion of more friendly business relations and mutual confidence and good will with each other and with the manufacturers; and to encourage and promote the commercial interests of the supply and machinery dealers of the South in every way possible; and to assist the manufacturers in deciding who are legitimate dealers in supplies and machinery, and who are entitled to prices as such; and to discourage the manufacturers from dealing direct with the consumer, but if any manufacturer finds it necessary to deal direct with the consumer in order to introduce and create a demand for his goods, he will invoice said goods through some dealer in the territory where the goods are sold.

The Opening Session.

On Tuesday morning, when President Peter E. Blow opened the convention, the ballroom of the Chamberlin Hotel was just comfortably filled with ladies, guests and members of the association. The address of welcome was delivered in an eloquent and masterful manner by Capt. Wyndham R. Mayo, president of the Chamber of Commerce of Norfolk, Va. John G. Christopher of Jacksonville, Fla., responded on behalf of the association in a very bright and happy speech of thanks. An address of welcome to the manufacturers, which was enthusiastically received, was delivered by C. H. Briggs of the Briggs Machinery & Supply Company, Dallas, Texas. The response was made by George T. Coppins of the Walworth Mfg. Company, Boston, Mass. It was very interesting and characteristic, and merited frequent interruption for applause.

The session of Tuesday afternoon was executive and was occupied in the dispatch of routine business, such as the reading of reports of standing committees and the nomination of special committees. It closed with a discussion of the question, "What Has the Association Accomplished During the Past Year?" This topic called forth many highly flattering remarks from the officers to the members and *vice versa*.

On Tuesday evening a reception and smoker was given, at which various members were called upon to offer impromptu features of entertainment, to the great amusement of those who were fortunate enough to be overlooked.

Election of Officers.

Wednesday morning's session was executive, and in addition to the presentation of and discussion on the suggestions of the Executive Committee and like matters, the officers and Executive Committee for the ensuing year were elected. The election resulted as follows:

President, Peter E. Blow, Southern Brass & Iron Company, Knoxville, Tenn.

First Vice-President, W. H. Kettig, Milner & Kettig Company, Birmingham, Ala.

Second Vice-President, C. H. Briggs, Briggs Machinery & Supply Company, Dallas, Texas.

Secretary-Treasurer, C. B. Carter, Knoxville, Tenn.

The following members were elected to serve on the Executive Committee:

John C. Dozle, Nashville Machine Company, Nashville, Tenn.

George A. Smith, Smith-Courtney Company, Richmond, Va.

Edward L. Stream, Gibbens & Stream, New Orleans.

George V. Denny, Georgia Supply Company, Savannah, Ga.

Minimum Selling Prices and Rebates.

A joint session of dealers and manufacturers was held on Wednesday afternoon. It was excellently attended, and the principal topic under discussion was as follows:

Is it not to the interest of the manufacturers, as well as of the dealers, for the manufacturers to establish minimum selling prices, and should not the dealers who maintain such prices be compensated by some rebate?

While the views of both manufacturer and dealer were given fullest expression on this interesting subject, no action of any sort was taken, and the points at question remained as debatable as ever at the close of the discussion.

W. H. Kettig of the Milner & Kettig Company, Birmingham, Ala., opened the discussion. He was followed by Edward L. Stream of Gibbens & Stream, New Orleans, who read a very interesting paper on the subject. W. M. Crumley, president of the Southern Hardware Jobbers' Association, was called upon by President Blow for a few remarks, and stated that the manufacturers should allow a margin of at least 20 per cent. for the jobbers, and if any of the latter did not maintain prices and retain this full margin of profit they should be deprived of the privilege of handling the goods. He said that he was in favor of having the manufacturers arbitrarily establish stiff prices. John J. Voorhees of the Voorhees Rubber Mfg. Company laid special stress upon the point that it would be extremely difficult to bring the premium system into play in the case of standard goods where competition is great. He also said that it would be difficult to establish a uniform line of prices to conform with the different localities into which the goods are shipped. C. F. Aaron of the New York Leather Belting Company said that the rebate system would handicap the manufacturer of an article of high quality, as it would furnish protection to the very one whom it is desired to secure protection against—the manufacturer of the lower priced and poorer quality article. Forbes Liddell of the Liddell Machinery & Supply Company, Montgomery, Ala., said that it would be impossible for manufacturers to establish minimum selling prices on general lines.

Standard Sizes for Trade Literature.

On recommendation of the Executive Committee the following resolution was brought to the attention of the manufacturers:

Resolved, That the association use its influence with the different manufacturers of all lines of goods which they sell to have them adopt a standard size of leaflet or page perforated for a standard size border to be adopted by the association showing cuts or lists of any articles which they manufacture and which they wish to bring before the notice of the dealer and his salesmen.

In the discussion which followed the presentation of this measure it was brought out that the association did not desire to lay down any certain size or type of general catalogue for the manufacturers, but simply wished them to adopt a special standard leaflet for dealers' use supplementary to their regular catalogue system. The manufacturers present showed a willingness to comply with the request and upon motion a committee was

appointed to take the matter up and suggest a standard size of leaf to be adopted by the association. This committee consists of C. H. Briggs of the Briggs Machinery & Supply Company, Dallas, Texas; J. A. Riechman of the Riechman-Crosby Company, Memphis, Tenn., and J. J. Disosway of the Cotton States Belting & Supply Company, Atlanta, Ga.

A resolution was adopted permitting manufacturers to be elected to honorary membership, making the standard of eligibility their being in accord with the policy of the association. Such honorary members are not chargeable with any fees or dues, and cannot attend executive sessions.

On Wednesday evening a reception and dance held at the hotel proved a brilliant success.

The sessions on Thursday were executive, the only feature of general interest being the selection of the next meeting place. It was decided that the meeting should be held in Savannah, Ga., at a date in next April to be selected by the Executive Committee.

The convention closed with a steamer trip up Hampton Roads to the great shipyards of the Newport News Shipbuilding & Dry Dock Company.

MANUFACTURING.

Iron and Steel.

The new blast furnace of the New Jersey Zinc Company, at Hazard, Pa., has been blown in. The furnace is of modern construction and has a daily capacity of from 75 to 80 tons of spiegeleisen. George C. Convers is general superintendent of the company's plant at that place and Robert H. Dodd is assistant superintendent.

The old Maynard steel mill Williamsport, Pa., is being dismantled.

It is reported that the recently organized Pacific Steel Company have acquired a large acreage of iron ore fields in the State of Michoacan, Mexico. All communications relative to the Pacific Steel Company should be addressed to the general superintendent, Willard Fuller, San Diego, Cal.

General Machinery.

At the annual meeting of Winter Brothers Company, Wrentham, Mass., manufacturers of the Thistle brand of taps and dies, held April 6, the resignation of F. A. Shepard as secretary and treasurer was accepted. J. E. Winter was elected president and Murray Winter secretary and treasurer.

In line with their present policy of improvement, the New Haven Mfg. Company, New Haven, Conn., of which Leslie Moulthrop is general manager, have had Dodge & Day of Philadelphia, Pa., go over their entire equipment with a view of bringing it up to date in every respect. Complete interior rearrangement of the shops is contemplated, and it is probable that a number of the old machine tools will be replaced by modern apparatus. The near future may also see this an electrically driven shop. Dodge & Day are redesigning the machine tools manufactured by this company to meet the requirements of the high-speed tool steels and cater to the growing demand for the modern motor driven apparatus.

The Heywood Bros. & Dobbins Iron Works, Jennings, La., who are to enlarge their plant, inform us that they will probably purchase soon, and will be pleased to receive quotations on a 20-inch lathe, wood split pulleys and leather belting.

F. H. Wakemen has purchased the whole of the stock of the Standard Machinery Company, Chattanooga, Tenn., and continues to manufacture the same lines as they did, consisting of machinery for sawmills, planing mills, coffin factories and wood yards, and also special machinery for insulator pins, side brackets and cross arms. The general manager is C. H. Hensel and the superintendent C. H. Riddell.

Pawling & Harnischfeger, Milwaukee, Wis., are making plans to commence work in four or five weeks on a new manufacturing plant on a tract of 20 acres of land just west of the city purchased by them last fall. The new property is admirably located, with switching facilities on all roads entering Milwaukee. The plant will be erected to accommodate at least 600 employees, the number that the company were employing at the time of the fire in their downtown plant some months ago. Work when commenced will be pushed to completion, so that the new plant can be operated some time next fall.

The Walton-Van Huffel Mfg. Company, Galesburg, Ill., have incorporated to conduct a general foundry and machine shop. Those interested in the company, which is capitalized at \$20,000, are M. S. Walton, Peter Van Huffel, W. P. Martin and H. A. Walton.

The Harrison Machine Works, Belleville, Ill., who recently disposed of the property and building in which was located their engine works and machine shop, will, during the present

season, erect a new machine and engine shop, which will be located on the 5-acre tract with the balance of their buildings.

The John A. Mead Mfg. Company, Chicago, contractors for equipment of coal plants and power stations, manufacturers of conveyors, &c., have recently made installations as follows: Equipped a coal handling plant for the Quincy Mining Company, Hancock, Mich., consisting of three steel hoisting towers and steel shed, with 16 automatic railways and pick up; also a large plant for the Canadian Pacific Railroad Company at Ft. William, Ontario, Canada, consisting of four steel hoisting towers, two movable bridges 275 feet long, with cable road, &c.

The Gelsner Mfg. Company, Waynesboro, Pa., have shipped their exhibit to the World's Fair at St. Louis. It consists of a 25 horse-power traction engine, 15 horse-power engine, one large and one small separator, a steam gang plow, one 12 and one 4½ horse-power Metcalfe gas engine. The company are having an exceptionally heavy run on Metcalfe engines.

The Landis Machine Company, Waynesboro, Pa., have added five new machines to their pattern making department.

The Allentown Electric Construction & Supply Company have been organized at Allentown, Pa., for the manufacture of all kinds of electrical machinery and appliances. Uriah H. Wileand, Walter E. Wileand, W. H. Gangeware, Robert E. Wright and William H. Miller are directors. The company will apply for a charter April 25.

The Lehigh Pulverizer Company have been organized at Allentown, Pa., for the manufacture of machinery and parts of machinery for pulverizing stone, cement, coal and other substances, and will apply for a charter April 22. J. W. Fuller is a director.

The Pennsylvania Shafting Company, Philadelphia, have been chartered at Harrisburg, Pa., with a capital of \$125,000. A. Jackson Wright is a director.

The Wilmarth & Morman Company, Grand Rapids, Mich., report that while trade is quiet compared with this time a year ago, yet shipments seem to be increasing, those of March being somewhat in excess of those in February. Among some of the sales which they have made in drill grinders within the past few days are the following: Stokes & Smith, Philadelphia, Pa.; Reim Specialty Company, Boston, Mass.; J. E. Hurley, Washington, D. C.; Vulcan Iron Works, Cairo, Ill.; Emerson Steam Pump Company, Alexandria, Va.; Cushing Bros. & Co., Limited, Calgary, Alberta; Albrecht & Heicht, Louisville, Ky.; Canadian Bridge Company, Walkerville, Ontario; Parkersburg Machine Co., Parkersburg, W. Va.; Eagle Square Mfg. Company, South Shaftsbury, Vt.; Singer Mfg. Company, Cairo, Ill.; Electro Dental Mfg. Company, Philadelphia, Pa.; Stewart & Bruckner, Nashville, Tenn.; Butte & Boston Consolidated Mining Company, Butte, Mont.; South Pacific Railroad Company, El Paso, Texas; King Iron Works, Buffalo, N. Y.; Grote Mfg. Company, Evansville, Ind.; nine to England and Scotland.

The Central Trust Company, receivers for the Indianapolis Drop Forging Company, Indianapolis, Ind., have filed an inventory of stock showing assets of \$61,000, including supplies, cash and bills receivable.

There will probably be considerable new equipment purchased this summer by the Miners' Foundry & Machine Products Mfg. Company, El Paso, Texas, who are to spend about \$25,000 in constructing and equipping a new plant. The company have secured a site of 4½ acres, with a frontage of 875 feet, on the Galveston, Harrisburg & San Antonio Railroad. On this property they are building a foundry, 65 x 186 feet, of brick and stone upon a concrete foundation. As soon as this building is completed they will erect a machine shop and other buildings, the structural iron work for which will be done in the machine shop. R. H. Thorne is agent.

The Central Machine Company, Niagara Falls, N. Y., have let contracts for the erection of a two-story plant, 60 x 120 feet, at a cost of \$10,000, which is expected to be completed by July 15. The power equipment has been ordered.

Frank H. Clark of Utica, N. Y., has purchased the plant of the late Rumsey-Williams Company at St. Johnsbury, Vt. The sale has to be confirmed by the court, and if it is it is Mr. Clark's intention to either put the machinery and other equipment on the market or sell the entire plant. It is fully equipped and is a first-class plant for any company that can use it.

John Hankin & Bro., 115-121 East Thirteenth street, New York, have incorporated with a capital stock of \$25,000. The company have been in business for a number of years, and no change is contemplated. They manufacture heating, ventilating and drying, elevating and conveying machinery, &c.

The Pittsburgh Valve, Foundry & Construction Company, engineers, founders, pipe fitters and machinists, of Pittsburgh, have discontinued their branch office in the New England Building, Cleveland, Ohio. The large machine shops of this concern in Pittsburgh were recently destroyed by fire, but they are occupying temporary shops and expect to fill all orders promptly. They will start to work in a short time on the building of a large machine shop at Twenty-sixth street, Pittsburgh, to replace the burned structure. They expect to be in the market later on for a large number of iron working tools to equip the new shops.

The Simonds Mfg. Company, Pittsburgh, manufacturers of cut gears and special machinery, report a heavy demand for their products. They have recently filled some large orders for motor gears and pinions and also for special gears and machinery. This company manufacture the Hindley type of worm gearing.

The Heyl & Patterson Company, Incorporated, Pittsburgh, will make application for a charter. They will succeed Heyl & Patterson, builders of conveying machinery of all kinds.

The J. George Leyner Engineering Works Company, manufacturers of mining machinery, Denver, Col., have placed contracts for the construction of their new plant, which will comprise the following buildings: Office building, 40 feet 8 inches x 40 feet 8 inches, two stories high, of brick and steel and fire proof construction; pattern shop, 40 feet x 101 feet 6 inches, brick, with wooden trusses; power house, 43 feet 8 inches x 64 feet 9 inches, brick and steel construction; machine shop, 101 feet x 206 feet 7 inches, brick and steel frame work construction; forge shop, 61 feet x 164 feet 9 inches, brick and steel construction, crane and trolley service throughout, and pattern storage, 40 feet x 76 feet, brick walls, wood trusses. The first floor of the machine shop has a main aisle with 20-ton electric crane running full length of building; side aisles have 5-ton hand power cranes, and a gallery is used for lighter machinery. All machines are to be electrically driven. Industrial railways will be constructed to all buildings throughout the plant, which will be connected with the Denver & Rio Grande Railroad by a private spur. The plant will occupy between 25 and 26 acres of land.

Power Plant Equipment.

The Wing Engine Company, Boston, Mass., recently incorporated, expect to install a plant to build sample engines, it being their intention to license other manufacturers to use their inventions on a royalty. It will probably be several months before the company shall be in shape to put their engines on the market. Address communications to the treasurer, Henry W. French, treasurer and general manager of the Revere Finance Company, 817 Paddock Building, Boston.

The Church Balanced Impact Steam Turbine Company have recently incorporated with a capital stock of \$750,000 for the manufacture of steam turbines, engines, &c. F. J. French, 20 Broad street, New York, is promoting the company, who, we understand, have substantial backing.

Sufficient funds have been subscribed to insure the establishment in Shippensburg, Pa., of the Domestic Engine Company of Hagerstown, Md., and the Etter Pump Company of Greencastle, Pa.

The Mayor and Town Council of New Freedom, Pa., will receive bids until April 30 for constructing water works and an electric light plant. There will be required one 70 horse-power boiler, one 50 horse-power engine, one 35-kw. generator, switch-board, &c.

Ex-Congressman C. G. Conn of Elkhart, Ind., has purchased the control of the Elkhart Power Company. He will spend \$1,000,000 to build a power plant. The city granted him a perpetual franchise.

The Camden Iron Works, Camden, N. J., have completed the building of their new boiler shop, and are installing the machinery.

The Home Water Works Company, Mt. Vernon, Ind., have been incorporated with \$80,000 capital by Jacob M. Harlem, Chas. T. Johnson, Wm. Gonnerman and Lyman B. Holleman.

The City Light & Power Company have been incorporated at Boonville, Ind., with \$12,000 capital, by J. F. Katterjohn, John E. Madden, Dorsey Reed, Louis J. Meyer and Wm. Roth.

Foundries.

The old established foundry business of Prespey Pero, Worcester, Mass., has been incorporated as the Pero Foundry Company, with a capital stock of \$15,000. Prespey Pero is president; Prespey Pero, Jr., vice-president; Ida G. Pero, secretary and treasurer, and these, with Edward Pero, constitute the Board of Directors.

The Colonial Foundry & Machine Company, South Norwalk, Conn., report that they have had a large amount of business the past few months and are now adding to their equipment. They are putting in a new 20-ton cupola, in addition to the present one of about 10 tons. The Bridgeport Boiler Works Company are building the cupola from the plans of the Colonial Foundry & Machine Company. A special drilling and tapping machine is also being built for this company and will be installed in about two months. This machine is to facilitate work on the steam and hot water boilers which they make, in addition to their regular casting business. A further improvement is an overhead tramway system which they are putting through the plant, including the foundry, machine shop, storage rooms, &c. With these improvements, and when fully settled in their new office adjoining the works, into which they have just moved, they will be better prepared to handle their large and increasing business.

A majority of the stockholders of the New York Car Wheel Company, Buffalo, N. Y., have consented to mortgage the company's plant to the North American Trust Company for \$269,000. The trust company is trustee for the bondholders.

The Wehrle Stove Company, Newark, Ohio, whose plant recently suffered \$100,000 damage by fire, are to rebuild as quickly as possible. The departments which were damaged to the greatest extent were the steel shop and mounting room.

The S. Obermayer Company, Cincinnati, Ohio, have secured the contract for complete foundry equipment for the technical school department of the Jas. E. Yeatman High School, St. Louis, Mo. They recently shipped to the Power Mining & Machinery Company, Cudahy, Wis., an entire foundry equipment, consisting of cupolas, ladles, foundry facings and supplies of all kinds.

A company is being formed in Phoenixville, Pa., for the erection of a general foundry plant adjoining the Heine Boiler Works.

Bridges and Buildings.

The Decatur Bridge Company, Decatur, Ill., have secured contract for the erection of a bridge at Lowell, Ill., to be 180-foot span. The contract price is \$7000.

The Board of Public Works of Milwaukee has been authorized to enter into a contract with the Milwaukee Bridge Company for the construction of a bridge across Bartlett street, made necessary by the depression of the tracks of the Chicago & Northwestern Railway. The bid accepted is \$25,200. The bridge will be 60 feet wide and modern in every particular.

The Jackson & Corbett Company, Chicago, have been awarded the contract for the construction of the Harrison street bridge at \$154,900, which was the lowest figure of six proposals. The remaining five bids are as follows: Chicago Bridge & Iron Company, \$157,800; Roemheld & Gallery, \$161,500; American Bridge Company, \$164,000; C. L. Strobel, \$173,500; Ritter-Conley Mfg. Company, \$193,100. The bridge calls for 2500 tons of steel.

The Board of Commissioners of Jay County, Ind., is having plans prepared for ten new steel bridges. W. L. Smith, auditor, Portland, Ind.

Wm. A. Reed, Cleveland, Ohio, has bought the plant of the Wabash Bridge & Iron Company, Wabash, Ind., for \$20,230, cash. The purchase includes the buildings, real estate, machinery and some material. Frank B. Wilkinson, trustee, reserved material amounting to \$10,400, to be sold for the benefit of the creditors. There are also assignments, valued at \$15,000, held by a Muncie and a Wabash bank. The appraisal of the property by the bankruptcy court was \$40,000. The company's liabilities were over \$300,000.

Fires.

The five-story building at 192 Michigan street, Chicago, Ill., occupied by the White Mfg. Company and the Faunt Bros. brass works was destroyed by fire last week, with a loss of \$62,000.

The New London, Conn., Iron & Metal Company sustained a loss of \$8000 by a fire in their storage building April 15. Two new steam engines were badly damaged.

The white lead and paint factory of John B. Phillips, Brooklyn, N. Y., was destroyed by fire April 14. The loss is placed at \$60,000.

The smelting works of the St. Louis Smelting & Refining Company, St. Louis, Mo., were damaged \$200,000 by fire on April 15.

A fire in the Gulf Oil Refinery, at Port Arthur, Texas, on April 16 did \$125,000 damage.

The large flour mill of the Miner-Hillard Company, at Miner's Mills, near Wilkes-Barre, Pa., was destroyed by fire last week. The loss is placed at \$150,000.

Miscellaneous.

The Standard Plunger Elevator Company, Worcester, Mass., have received the contracts for 110 plunger elevators for the Wanamaker buildings in New York and Philadelphia, two-thirds of the number to be installed in the Philadelphia building and the remainder in New York; 14 elevators for the new Trinity Building, New York, and ten for the Tiffany Building, New York. This new business will probably necessitate an addition to the Standard Company's shops at Jamesville, though it is unlikely that work on new buildings will begin before next fall.

The Kelly Foundry & Machine Company, Goshen, Ind., through their New York office, have recently closed a contract with the Borden Condensed Milk Company for 16 large tanks made of No. 12 galvanized steel and eight to be made of No. 14 galvanized steel. Each of the tanks is perfectly air tight and fitted with large cast iron manholes with plate and crabs. Seven flat cars were required to make the shipment.

The Bon Air Coal & Iron Company, Nashville, Tenn., state that the opening of their mine at Eastland is progressing favorably, and their coke ovens are completed as far as practicable until the railroad is finished to that point, which will be in a few weeks, when the fire brick necessary to their lining will be delivered. They expect to be shipping coke by July 1.

The Mahoning Motor Car Company have been organized at Youngstown, Ohio, and have elected the following officials: L. E. Cochran, president; W. J. Hitchcock, vice-president; D. E. Webster, secretary, and W. P. Williamson, treasurer and general manager. The company are equipping a machine shop which they expect to have in operation in about ten weeks. They will build a substantial runabout and touring car.

The Iron and Metal Trades

A slight feeling of hesitation has crept into the Iron and Steel markets during the past week. In those sections which draw upon the Lake ranges chiefly for their Ore the outcome of the meetings of the interests is awaited with some anxiety. The representatives are in session at this writing. So far as the large Steel companies are concerned, being, as they are, largely self contained, any change in price has only incidental effect. It is the selling price of the Finished Iron and Steel, and not the bookkeeping entry relating to Ore prices, which determines the revenues. The smaller outside interests, which must purchase Ores, would, of course, be the gainers by an open market.

The withdrawal of the Steel Corporation from the Pig Iron market, too, has had a chilling effect, since expectations of relief from that quarter ran rather high in some districts. It is understood, however, that the furnaces of the corporation are doing unexpectedly well, so that the prospect of any purchases for May delivery is decidedly slim.

The reports of cancellations of contracts of Bessemer Pig Iron on the part of the United States Steel Corporation are based on an incorrect understanding of the situation. In the middle of last month the corporation notified the sellers that Iron not delivered during March as per contract would not be taken after the expiration of the month. When the time came one interest had failed to deliver 2000 tons and another interest 10,000 tons, and the Iron was not taken. This month there are to be delivered 56,000 tons, and at the rate at which shipments are being made the Iron will be duly received.

While the pressure for deliveries on the mills and furnaces in many lines continues quite heavy—always excepting those serving the railroads—their books do not show the orders for the third quarter which makers would like to have. With buyers doubtful and somewhat reluctant, sellers are inclined to be eager, so that what business is coming up is closely contested. Under the circumstances prices are holding their own very well indeed, but in those lines in which there is an open market there is not much expectation of an advance. In the pooled products the complaints of sales agents to their principals of irregularities have not had any effect.

The transfer of the Clairton properties to the Steel Corporation has no immediate bearing on the markets, except that it tends to eliminate a weak seller.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous

Apr. 20, Apr. 13, Mar. 23, Apr. 22,
1904. 1904. 1904. 1903.

PIG IRON:

Foundry Pig No. 2. Standard, Philadelphia	\$15.00	\$15.00	\$15.00	\$21.25
Foundry Pig No. 2. Southern, Cincinnati	12.50	12.50	12.50	20.25
Foundry Pig No. 2, Local, Chicago	14.00	14.00	14.00	22.80
Bessemer Pig, Pittsburgh	14.20	14.35	14.10	20.85
Gray Forge, Pittsburgh	13.00	13.25	13.35	20.25
Lake Superior Charcoal, Chicago	15.25	15.25	14.75	23.00

BILLETS, RAILS, &c.:

Steel Billets, Pittsburgh	23.00	23.00	23.00	30.50
Steel Billets, Philadelphia	25.00	25.00	25.00	29.50
Steel Billets, Chicago	24.00	24.00	24.00	31.25
Wire Rods, Pittsburgh	31.00	31.00	31.00	37.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL:

O. Steel Rails, Chicago	11.50	11.50	11.50	18.50
O. Steel Rails, Philadelphia	15.00	15.00	15.00	21.50
O. Iron Rails, Chicago	17.00	17.00	16.50	24.50
O. Iron Rails, Philadelphia	18.50	18.50	18.00	25.00
O. Car Wheels, Chicago	14.00	14.00	14.50	24.00
O. Car Wheels, Philadelphia	13.50	13.50	13.50	24.00
Heavy Steel Scrap, Pittsburgh	13.75	13.75	14.00	21.50
Heavy Steel Scrap, Chicago	11.50	11.50	11.50	18.50

FINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia	1.48½	1.48½	1.48½	1.93½
Common Iron Bars, Chicago	1.50	1.50	1.50	1.80
Common Iron Bars, Pittsburgh	1.40	1.40	1.40	1.85
Steel Bars, Tidewater	1.49½	1.49½	1.49½	1.75
Steel Bars, Pittsburgh	1.35	1.35	1.35	1.60
Tank Plates, Tidewater	1.74½	1.74½	1.74½	1.85
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater	1.74½	1.74½	1.74½	1.73½
Beams, Pittsburgh	1.60	1.60	1.60	1.60
Angles, Tidewater	1.74½	1.74½	1.74½	1.73½
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Iron, Pittsburgh	1.45	1.45	...	2.00
Skelp, Sheared Iron, Pittsburgh	1.52½	1.52½	...	2.05
Sheets, No. 27, Pittsburgh	2.15	2.15	2.15	2.65
Barb Wire, f.o.b. Pittsburgh	2.50	2.50	2.50	2.60
Wire Nails, f.o.b. Pittsburgh	1.90	1.90	1.90	2.00
Cut Nails, f.o.b. Pittsburgh	1.75	1.75	1.75	2.15

METALS:

Copper, New York	13.12½	13.12½	12.75	15.00
Spelter, St. Louis	5.05	5.05	4.80	5.40
Lead, New York	4.50	4.50	4.50	4.65
Lead, St. Louis	4.40	4.42½	4.40	4.57½
Tin, New York	27.87½	27.87½	28.85	29.50
Antimony, Halett, New York	7.25	7.25	7.25	7.00
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.64	3.64	3.64	3.99

Chicago.

FISHER BUILDING, April 20, 1904.—(By Telegraph.)

Last week was quiet all along the line, and the present week opens without animation. Indications are that unless there is a decided change for the better the month of April will fall behind the month of March in business generally. There seems, however, to be enough business current to prevent breaking of prices, for prices have been maintained, almost without exception, both on Pig Iron and on Finished Iron and Steel products. In the West the all important topic is crop conditions, and this year, as in previous years, the mournful ones are beginning to prophesy a short winter wheat crop and all sorts of untoward weather conditions for the other cereals. We have had a number of years of good crops at relatively high prices and the West is rich, so rich that it can stand one poor year if necessary, though there is really nothing to lead the man who takes a comprehensive view of the situation to take seriously the gloomy forebodings of the bear element. Pig Iron remains at the \$10 basis, Birmingham, or \$13.85, Chicago, for No. 2 grade, and \$14 to \$14.50, Chicago, for No. 2 Northern, and there is a barely noticeable disposition on the part of buyers to cover their requirements for the second half, or at least for the third quarter, on this basis. A good demand exists for small Billets for wagon axles and skeins, though the general Billet business is quiet. Heavy Section Rails are in only small demand. Very little new business has been placed, and railroads are none too active in specifying on existing contracts. The Light Rail business is also quiet. A slight awakening is noticed in Structural, though it is not enough to be encouraging. Plates continue to be quiet, though the leading producers state that their Plate business is improving satisfactorily. Sheets are firmer than they

have been for some weeks, but this is due rather to the forces that have been working to keep association mills in line than to any increase in actual demand. There is no doubt that association Sheet mills and the independent mills are endeavoring to maintain the association scale of prices, and that price cutting is the exception rather than the rule. Bar Iron is still held at 1.50c., Chicago, very generally, and it would be practically impossible to buy a single car lot at less than that price, though \$1 a ton better has been done on large tonnages of one size carrying favorable extras. Bar Steel remains at the standard price of 1.51½c., Chicago, half extras, with a good demand for both Iron and Steel Bars from agricultural implement and other interests. Indications are that large jobbers of Pipe, who have been keeping the mills busy with specifications and orders, are about through with their purchases, and have decided to withhold further purchases until the consuming demand becomes more evident. Consumption of Pipe has been generally delayed in the West by unfavorable conditions of weather and ground. Boiler Tubes continue to be in slow demand, with a tendency on the part of mills to shade prices where necessary to get business. Cast Iron Pipe has been advanced \$1 per ton by the leading producers, in sympathy with the strength in Pig Iron of the last month or two, and a fair business is being done in Cast Pipe. Merchant Steel remains unchanged, except for an advance in Railway Spring Steel, the exact price of which has not yet been announced here. Implement concerns are reported to be specifying liberally on contracts, and quite a number of new contracts are being closed for delivery up to July, 1905. Old Material is steady, and it is given out that large lists offered by leading Western roads have been sold readily at higher prices than the trade prophesied the roads would secure. Copper, Tin, Lead and Zinc are unchanged in price, with enough demand to keep prices steady. The Coke market is disturbed by very large amounts of demurrage Coke on track here—Coke that was ordered months ago and was delayed by the carriers, only to be dumped into the city all at once. Wire products are in steady demand, with no change in prices and, apparently, less likelihood of an advance than there was a month ago.

Pig Iron.—The incipient boom of March has flattened out, and while prices are being maintained the demand for Iron interests in the Western market is not as great as it promised to be. Rather more Northern than Southern Iron is being sold here, but no large orders have been placed, unless one might call orders for 1000 tons large. Southern Iron, as far as can be learned, is not offered by any interest at less than \$13.85, Chicago, or \$10, Birmingham, rumors to the contrary notwithstanding. Northern Irons are firm at \$14 to \$14.50, delivered, team track or consumers' switch, Chicago, the bulk of the Iron being sold at the basis of \$14.25 to \$14.35. It would require a large and desirable order to secure the \$14 price. Jobbing foundries are only fairly active, and while there is some tendency on the part of melters to look ahead with a view of covering their requirements for the third and fourth quarters at present prices, it is only embryonic, and is not encouraged by the Iron interests themselves. In other words, the majority of buyers believe that third-quarter Iron will be lower than it now is, and sellers have some hopes that it will be higher. Our quotations on Nos. 1 and 2 Soft Southern Iron have been erroneous, and this week we advance them to the same basis as Nos. 1 and 2 Southern Coke, as they should be. Otherwise no changes are made in last week's prices, which we repeat, as follows:

Lake Superior Charcoal.....	\$15.25 to \$15.75
Northern Coke Foundry, No. 1.....	14.50 to 15.00
Northern Coke Foundry, No. 2.....	14.00 to 14.50
Northern Coke Foundry, No. 3.....	13.50 to 14.00
Northern Scotch, No. 1.....	14.50 to 15.00
Ohio Strong Softeners, No. 1.....	15.30 to 15.80
Ohio Strong Softeners, No. 2.....	14.80 to 15.30
Southern Silvery, according to Sillean.....	14.85 to 15.85
Southern Coke, No. 1.....	to 14.35
Southern Coke, No. 2.....	to 13.85
Southern Coke, No. 3.....	to 13.35
Southern Coke, No. 4.....	to 12.85
Southern Coke, No. 1 Soft.....	to 14.35
Southern Coke, No. 2 Soft.....	to 13.85
Southern Gray Forge.....	to 12.60
Southern Mottled.....	to 12.35
Malleable Bessemer.....	14.00 to 14.50
Standard Bessemer.....	15.80 to 16.30
Jackson County and Kentucky Silvery, 6 to 10 per cent. Sillean.....	16.80 to 18.30
Alabama Basic.....	to 13.85
Virginia Basic.....	14.60 to 14.85

Billets.—The activity of the wagon and carriage business in the West is reflected in a healthy demand for small Billets for wagon axles and skeins, but aside from this the Billet business is rather quiet. Prices remain unchanged on the basis of: Forging Billets, 4 x 4 and larger, \$24 per gross ton, Chicago, in carload lots; Axle Billets and Billets smaller than 4 x 4, \$25.

Rails and Track Supplies.—Only a fair amount of new business is being booked on Standard Section Rails, and this business consists of a multitude of small orders for replacing rather than for new trackage. Leading Western roads are none too active in specifying on existing contracts, but the largest producers of Rails in the West view this fact with complacency, as they claim to have a sufficient tonnage on

their books to keep their mills fairly busy for the balance of the season. This is not saying that they could not handle much more business than they have. Aside from Spikes, on which we reduce the price \$1 per ton, prices are unchanged, as follows: Standard Section Rails, \$28 per ton for 500-ton lots and greater; Light Rails, \$25 to \$27 per ton. Angle Bars are still quoted 1.40c. to 1.50c., Spikes at 1.65c. to 1.75c., base, while Track Bolts have been reduced to 2.30c. to 2.35c., base, with Square Nuts, and 10c. to 15c. extra for Hexagon Nuts.

Structural Material.—The only transactions of note during the week under review are the placing of the contract for about 4000 tons of Steel for the new office building to be erected by the Chicago & Northwestern Railway, at Franklin street and Jackson Boulevard, and the contract for the Harrison Street Bridge, which will require about 2500 tons of Steel. The contract for the Northwestern Building was placed with the American Bridge Company, making the fifth of a chain of five large buildings placed with that company during the present year. The Fuller Construction Company are general contractors. The contract for the superstructure of the Harrison Street Bridge was placed with Jackson & Corbett. Aside from this the structural business is quiet. Prices are unchanged, both from store and from mill, as follows: I-Beams and Channels up to and including 15 inches and Angles 3 inches on one leg and larger, 1.76½c., Chicago; Tees, \$1 per ton extra. Store prices on Structural are as follows: Angles, Beams, Channels and Zees, base sizes, 2c. to 2.10c.; Tees, 2.05c. to 2.15c., either random lengths or cut to lengths 5 feet and over.

Plates.—The leading producers of Plates profess to see a marked increase in activity, and to believe that after all it will be a good Plate year, but other large interests do not share in this optimistic view. It may be said without contradiction that the Plate market is quiet, and that prices are being held up by main strength rather than through any relationship of supply and demand. Prices are unchanged. We quote, carload lots, from mill, f.o.b. Chicago: Tank Steel, ¼-inch and heavier, 1.76½c.; Flange steel, 1.86½c.; Marine, 1.96½c.; Universal Mill Plate, 1.76½c. to 1.81½c.; 3-16 inch Tank, 1.86½c.; Nos. 7 and 8, 1.91½c.; No. 9, 2.01½c.; No. 10, 1.91½c. to 1.96½c.; No. 11, 1.96½c. to 2.01½c.; No. 12, 2.01½c. to 2.06½c. Store prices on Plates have been reduced as follows: Tank Plate, 100 inches wide or less, ¼-inch and heavier, 2c. to 2.10c.; 3-16 inch, 2.05c. to 2.15c.; Nos. 8 and 10, 2.10c. to 2.20c.; Flange quality, 25c. per 100 lbs. extra.

Sheets.—There is an earnest disposition on the part of mills in the independent association as well as on the part of the leading producer to maintain the prices quoted below. This does not mean that prices are being maintained in all cases, but that the average buyer of single carload lots will be quoted these prices by the mills in the association, and will have to pay the price to get his material unless he can show the mills that lower quotations come from other sources. Not that there is any actual agreement on the part of the leading producers that they will lose business rather than recede from these quotations, but that the prices named are a working basis which is maintained under ordinary conditions, and when either the leading producer or an independent makes a cut it is met by the other party to the competition. Association prices are about as follows: Nos. 9 and 10, 2.01½c.; Nos. 11 and 12, 2.06½c.; Nos. 13 and 14, 2.11½c.; Nos. 15 to 17, 2.16½c.; Nos. 18 to 21, 2.21½c.; Nos. 22 to 24, 2.26½c.; Nos. 25 and 26, 2.31½c.; No. 27, 2.36½c.; No. 28, 2.46½c.; No. 29, 2.56½c.; No. 30, 2.71½c. Store prices on Sheets, 16 gauge and heavier, have been revised and reduced as follows: Nos. 8 and 10, 2.10c. to 2.20c.; No. 12, 2.15c. to 2.25c.; No. 14, 2.25c. to 2.35c.; No. 16, 2.30c. to 2.40c.; Nos. 18 and 20, 2.50c. to 2.55c.; Nos. 22 and 24, 2.55c. to 2.60c.; No. 26, 2.65c. to 2.70c.; No. 27, 2.75c. to 2.80c.; No. 28, 2.80c. to 2.85c.; No. 29, 2.95c. to 3c.; No. 30, 3.10c. to 3.15c. Galvanized Sheets are still quoted at from 80 to 80 and 5 discount, Pittsburgh, in car lots. Store prices on Galvanized Sheets remain unchanged at 75 and 7½ to 75 and 10 per cent. discount.

Bars.—The Bar situation is unchanged as to prices and practically so as to the complexion of the business situation. The leading producers state that the April specifications up to the present date are well on a par with those of the month previous, though other Bar interests acknowledge with some reluctance that April business is falling off as compared with March. The ruling price for Bar Iron is 1.50c., base, half extras, for carload lots, f.o.b. Chicago, but there are instances, and naturally so, where certain very desirable tonnages, as, for instance, 200 to 300 tons of a size carrying good extras, have been sold for 1.45c., base, half extras. The casual buyer, however, who will attempt to buy mixed car lots at 1.45c., Chicago, will not be able to find takers for his offers. Steel Bars are firm at 1.51½c., which is 1.35c., Pittsburgh, base, half extras. Less than car lots are quoted at \$1 per ton extra at Pittsburgh, plus the less than carload freight, and quantity extras prevail whether in car lots or less than car lots, as follows: Less than 2000 lbs. and more than 1000 lbs. of a size, 15c. per 100 lbs. extra; 1000 lbs. or less of a size, 30c. per 100 lbs. extra. The Bar

business may be said to be good, probably the best on the whole list, because of the activity of specifications on the part of Agricultural Implement manufacturers. There is some disposition on the part of the Implement people to anticipate their wants for the autumn season, and contracts are being closed up to January, 1905. There is no change in the Hoop situation, and buying is light because of the extremely heavy purchases made just before the last advance. Store prices on Bars are as follows: Iron Bars, 1.75c., base, full extras; Steel Bars, 1.70c. to 1.80c., base, half extras; Hoops, 2.10c. rates, full extras.

Merchant Steel.—It is reported here that an advance was made on Railway Spring Steel April 12 by Pittsburgh mills, but the new price has not yet been announced authoritatively. Aside from this last week's quotations prevail, and the leading interests profess to be highly pleased with the manner in which Implement concerns are specifying on existing contracts and with the disposition on their part to make contracts up to July, 1905, at current prices. Quotations are as follows, in car lots, Chicago: Open Hearth Spring Steel to the general trade, 2c. to 2.25c.; Smooth Finished Machinery Steel, 1.76½c. to 1.81½c.; Smooth Finished Tire, 1.71½c. to 1.76½c.; Sleigh Shoe, flat, 1.56½c. to 1.61½c.; Sleigh Shoe, concave and convex, 1.66½c. to 1.71½c.; Cutter Shoe, 2.25c. to 2.35c.; Toe Calk Steel, 2.06½c. to 2.11½c.; Crucible Tool Steel, 6½c. to 8c.; Special grades of Tool Steel, 13c. and up; Shafting at 52 per cent. in car lots and 47 per cent. in less than car lots.

Merchant Pipe.—Unless the demand on the part of the consuming interest weakens very soon, Pipe mills will have caught up with their business and will be crying for orders. As it is, merchants who have been keeping the mills busy all winter on their orders are well stocked, and are now waiting for conditions of ground and weather to permit outdoor operations that will call for the Pipe that they have in store. Discounts remain unchanged, as follows:

	Steel Pipe.		Guar. Wrought Iron.	
	Black.	Galv.	Black.	Galv.
1/4 to 3/8 inch.....	66.35	56.35	64.35	54.35
1/2 inch.....	69.35	59.35	67.35	57.35
3/4 to 6 inches.....	73.35	63.35	71.35	61.35
7 to 12 inches.....	69.35	59.35	66.35	56.35
Less than carloads, 12½ per cent. advance.				

Boiler Tubes.—The discounts named below are those commonly quoted for Chicago delivery in carload lots by the leading producers. An extra 5 per cent. discount is often offered by independents and sometimes two 5's, with here and there a quotation lower still. The demand is slow and heavy and mills are scrambling energetically to secure what business there is going:

	Steel.	Iron.	Seamless steel.
1 to 1 1/4 inches.....	43.35	40.80	53.35
1 1/4 to 2 1/4 inches.....	55.85	38.35	40.35
2 1/4 to 3 inches.....	58.35	43.35	40.35
3 to 5 inches.....	64.35	50.85	48.35
6 to 13 inches.....	55.85	38.35	48.35

Store discounts are as follows, and these are adhered to by all the leading warehouse men:

	Steel.	Iron.	Seamless steel.
1 to 1 1/4 inches.....	40	35	37½
1 1/4 to 2 1/4 inches.....	50	32½	35
2 1/4 to 3 inches.....	60	45	45
3 to 5 inches.....	50	32½	..
6 inches and larger.....	50	32½	..

Cast Iron Pipe.—Better conditions prevail in this market—so much so that prices have been advanced about \$1 per ton. The leading producer announces the following among other sales: City of Chicago, 3700 tons of 36-inch Water Pipe; Miamisburg, Ohio, 1650 tons of Water Pipe; Dayton, Ohio, 600 tons; Denver, Col., 500 tons. The awakening demand and the increased cost of Pig Iron as compared with a month or two ago have led to the stiffening of prices, current quotations being about on the basis of \$27 for 4-inch Water Pipe; \$26 for 6 to 12 inch, and \$25 for larger than 12-inch, with \$1 extra for Gas Pipe.

Old Materials.—The leading Western railroads, who are placing lists on the market almost weekly, give the public to understand that they are selling all the items on their list at excellent prices, but a canvass of the logical buyers of this material fails to reveal any purchases of consequence. The inference is either that the railroads are misleading the buying public or that buyers not known to the general trade are in the market absorbing this material. Certain it is that the leading Western buyers are not now a consequential factor in the Scrap market, as their requirements have been filled and their every effort seems to be in the line of reducing purchases to the smallest possible amount, in the belief that the present values are fictitious and cannot long remain. The Wabash is out with a list aggregating about 500 tons to be closed this week. The Santa Fe's list of last week is said to have been disposed of at satisfactory prices to the company, although there is always a doubt as to the actual disposition of the tonnage named on such lists. The leading interests here, both buyers and sellers, are bears on the market, as they argue that it is out of the question to hold prices of Scrap at the relatively high figures at which they are now quoted. Notwithstand-

ing this fact, it is necessary to note advances on some lines, as follows: Iron Car Axles, 25c. advance; Steel Car Axles, 50c. advance; while, on the other hand, Cast and Mixed Borings have apparently declined about 25c. from their former minimum, making ruling prices on Scrap Material about as follows, per gross ton, Chicago:

Old Iron Rails.....	\$17.00 to \$17.25
Old Steel Rails, 4 feet and over.....	13.00 to 13.50
Old Steel Rails, less than 4 feet.....	11.50 to 12.00
Heavy Relaying Rails, subject to inspection.....	23.00 to 24.00
Heavy Relaying Rails, for side tracks.....	18.00 to 20.00
Old Car Wheels.....	14.00 to 14.25
Heavy Melting Steel Scrap.....	11.50 to 12.00
Mixed Steel.....	9.50 to 10.50

The following quotations are per net ton:

Iron Fish Plates.....	\$13.50 to \$14.00
Iron Car Axles.....	17.25 to 17.50
Steel Car Axles.....	15.50 to 16.00
No. 1 Railroad Wrought.....	12.50 to 13.00
No. 2 Railroad Wrought.....	11.50 to 11.75
Shafting.....	13.50 to 14.00
No. 1 Dealers' Forge.....	10.00 to 10.50
Wrought Pipe and Flues.....	9.00 to 9.25
Iron Axle Turnings.....	8.50 to 9.00
Soft Steel Axle Turnings.....	8.50 to 9.00
Machine Shop Turnings.....	7.50 to 8.00
Cast Borings.....	4.50 to 5.00
Mixed Borings, &c.....	4.50 to 5.00
No. 1 Mill.....	7.75 to 8.25
Country Sheet.....	7.25 to 7.50
No. 1 Bolders, cut in Sheets and Rings.....	9.00 to 9.50
Heavy Cast Scrap.....	11.00 to 11.50
Stove Plate and Light Cast Scrap.....	9.00 to 9.50
Railroad Malleable.....	10.00 to 10.50
Agricultural Malleable.....	9.50 to 10.00

Metals.—We repeat last week's quotations as representing the present market. All the metals named are firm enough to hold prices where they are. We quote: Copper, 13½c. for Casting and 13¼c. for Lake; Pig Tin, 29½c. to 29.60c.; Pig Lead, 4.45c. for 50-ton lots, 4.50c. for ton lots and about 4.85c. for small lots; Spelter, 5½c. to 5¼c.; Sheet Zinc, 5.85c. in car lots of 600-lb. casks and 6.05c. to 6.10c. for less than car lots. Old Metals are steady at previous prices. We quote: Copper Wire and Heavy, 11¼c.; Copper Bottoms, 10¼c.; Copper Clips, 10¼c.; Red Brass, 10¼c.; Red Brass Borings, 9c.; Yellow Brass, Heavy, 8¼c.; Yellow Brass Borings, 6¼c.; Light Brass, 6¼c.; Tea Lead, 4c.; Zinc, 3¼c.; Pewter, No. 1, 18¼c.; Block Tin Pipe, 24c.

Coke.—On every hand one hears complaint about demoralization of the Chicago Coke market by what is known as demurrage Coke. It is said that there are hundreds of cars of Coke on track, Chicago, which should have arrived a month ago, and the influx of this vast tonnage all at once has tended to break prices. Holders of the Coke, who could have sold it at a nice price a month ago, are now forced to sacrifice profits rather than pay the \$1 per car daily demurrage. For that reason it is hard to state what the actual price of Coke in the Chicago market is. In general it may be said that prices range from \$4.65 to \$5 per ton for 72-hour Connellsville Foundry Coke and about 50c. less for Furnace Coke. Ovens which enjoy the advantage of the low L. & N. freight are still sending in liberal quantities of Coke, and this also has a tendency to depress the market, the Wise County, Va., Coke selling here at from \$4.25 to \$4.75 per ton for 72-hour Foundry quality.

The Chicago offices of the Northern Electrical Mfg. Company and the Stanley Electrical Mfg. Company, at 15 Monadnock Block, will be removed May 1 to Rooms 425-428 in the same building.

The Inland Steel Company are moving their offices this week from the Marquette Building to the eighth floor of the First National Bank Building. The Ohio Iron & Metal Company removed last week from the Stock Exchange Building to the First National Bank Building. These two firms, added to the Republic Iron & Steel Company, who removed last week, will make the First National Bank Building one of the three or four leading Steel centers of Chicago.

Philadelphia.

FORREST BUILDING, April 19, 1904.

The Iron market has not gained in activity during the past week. Prices are unchanged, but in spots they are somewhat easier, and it begins to look as though things were pretty much at the high level for the present. A good deal of business was taken during March on the assurance that prices would be advanced, but when the advance became effective orders dropped off, and there are some fears that another period of dullness has set in. At this season, however, there should be a good deal of activity, so that it is hoped that no reaction of any account will be felt in the near future. The furnace report of last week was unexpectedly favorable. A decrease in stocks of 74,000 tons, with an increase in production estimated at 60,000 tons, certainly indicates healthy conditions during the past few weeks. Moreover, it may be that business is more depressed in this vicinity than in other districts, although even here it is by no means bad; but there are so few inquiries for the last half of the year that it is impossible to feel hopeful in regard to the general outlook. The current quarter has

been provided for already, but what is now wanted is something for the third quarter, and until that develops there will naturally be more or less uncertainty. Pig Iron is scarce for prompt shipment; Steel Billets are also rather hard to get inside of 30 to 60 days, and in some cases Bars, both Iron and Steel, are subject to more or less delay. Plates, Sheets, Structural Material and other specialties are rather slow sale, so that shipments of these can be made almost as required. Taking everything into consideration, it may be said that, while the average conditions are fair, there is some disappointment that orders are restricted to 30 or 60 days' requirements, leaving dates beyond that vague and therefore unsatisfactory. This is the more accentuated by the fact that the Presidential nominations are approaching and that the crop reports are not favorable thus far, although, of course, there is plenty of time to make a good recovery. It is hoped that the absence of forward orders is due more to precaution than to really bad conditions, and that short trades may be so frequent as to bring up the average to respectable proportions.

Pig Iron.—The market shows but little change from last week. It is perhaps a little quieter, and the disposition to push for higher prices is less marked, but in all essential features it is unchanged. Good Irons are scarce for prompt shipment, but as the furnace output is increasing, there is less fear of scarcity than there is of an oversupply. Consumers are not in the least uneasy, and unless they can fill their requirements at satisfactory prices they postpone purchases. The day to day demand is very good, however, and this, with shipments on previous contracts, keeps the market on an even keel. As to the final outcome it is difficult to express an opinion with any great confidence, as it depends very largely on matters which are as yet embryotic, although it is noticeable that expectations of improvement are based on favorable happenings, without which inferences seem to indicate reaction from present conditions. Ultra conservatism undoubtedly prevails everywhere, which is not a bad feature, although it is difficult to get up an active market until there is a great deal more confidence than there is at the present time. These conditions tend to safety, however; so that if the market is not active, it is at least free from the danger of sudden reaction. The chances appear to be, therefore, that for the present prices will remain at about their present level, with no great pressure to either buy or sell until something occurs to give distinct indications, favorable or unfavorable. To-day's prices are about \$15.25 for No. 2 X Foundry and \$13.75 for good Mill Irons. Southern Irons are firmly held at prices equivalent to \$14 on dock to \$14.50, rail shipment, for No. 2 X; lower grades in proportion. These Irons are firmly held, one of the leading companies claiming to be out of the market; so that the immediate offerings are somewhat restricted. Basic Iron is scarce at about \$14, but no great inquiry at the moment. The general range for Philadelphia or nearby deliveries would be about as follows:

No. 1 X Foundry.....	\$15.75 to \$16.00
No. 2 X Foundry.....	15.00 to 15.25
No. 2 Plain.....	14.50 to 14.75
Southern No. 2, rail shipment.....	14.35 to 14.50
Southern No. 2, on dock.....	13.75 to 14.00
Standard Gray Forge.....	13.75 to 14.00
Ordinary Gray Forge.....	13.00 to 13.25
Basic.....	14.00 to 14.10

Steel.—There is a good demand, and mills that are in operation find plenty of business. Chester and Wilmington mills are doing nothing at the present time, and one at least is considered out of the race until conditions change. The Alan Wood Iron & Steel Company are running all their furnaces full, but most of their product goes into their own or other nearby mills. Price, about \$25 on good sized orders.

Plates.—The demand is somewhat disappointing, although the average of the past few weeks is maintained, but no material additions are made to the orders on the books. The miscellaneous demand is very good, but the absence of large orders is a conspicuous feature, although there is some hope that they will be forthcoming in the near future. Prices are unchanged, as follows:

	Carloads.	Part Cents.
Tank Steel, ¼ inch and heavier.....	1.73½	1.78½
Tank Steel, 3-16 inch.....	1.83½	1.88½
Tank Steel, Nos. 7 and 8, B. W. G.....	1.88½	1.93½
Tank Steel, Nos. 9 and 10, B. W. G.....	1.98½	2.03½
Flange or Boiler Steel.....	1.83½	1.88½
Commercial Fire Box Steel.....	1.93½	1.98½
Still Bottom Steel.....	2.03½	2.08½
Locomotive Fire Box Steel.....	2.23½	2.28½
Plates over 100 to 110 inches.....	.05 per lb. extra	
Plates over 110 to 115 inches.....	.10	
Plates over 115 to 120 inches.....	.15	
Plates over 120 to 125 inches.....	.25	
Plates over 125 to 130 inches.....	.50	
Plates over 130 inches.....	1.00	
All sketches (excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)...	.10	
Complete Circles.....	.20	
Shell grade of Steel abandoned.		

Structural Material.—No great gains can be reported in this department, although there is a pretty fair demand for

small and medium sized lots. The spring trade has been disappointing thus far, but it is believed that better conditions will prevail in the near future. Prices unchanged: Beams, Channels and Angles, 1.73½c. to 1.85c., according to specifications, and small Angles, 1.50c. to 1.55c.

Bars.—The Bar trade is exceptionally favored at the present time; mills have plenty of work at full prices. It is intimated that a slight advance may be made at the next monthly meeting, but the matter will not be decided until full reports are made by members of the association. Meanwhile prices for both Iron and Steel remain at 1.48½c. as a minimum for carload lots, although the best makes command as high as 1.55c.

Sheets.—The demand is fully maintained, and while orders have not accumulated to any extent, it requires a full output to keep pace with the call for deliveries.

Old Material.—The market is hard to follow, and prices are subject to wide variation. Consumers of Steel consider \$14 about as much as they ought to pay, but it would be hard to get anything to-day at less than \$15 to \$15.25. No. 1 Railroad Wrought Scrap is also subject to all sorts of changes. Buyers consider \$17.50 to \$18 full value, yet railroads have sold direct to consumers at a full dollar more money, and so it goes all the way through. Bids and offers are about as follows for deliveries in buyers' yards:

No. 1 Steel Scrap.....	\$15.00 to \$16.00
Low Phosphorus Scrap, nominal.....	18.00 to 18.50
Old Steel Axles.....	18.00 to 19.00
Old Iron Rails.....	18.50 to 19.00
Relaying Rails.....	21.00 to 22.00
Old Iron Axles.....	22.00 to 22.40
Old Car Wheels.....	13.50 to 14.00
Choice Scrap, R. R. No. 1 Wrought.....	18.00 to 18.50
Yard Scrap.....	16.00 to 17.00
Machinery Scrap.....	13.50 to 14.00
No. 2 Forge Fire Scrap.....	13.00 to 13.50
No. 2 Forge Fire Scrap (Ordinary).....	10.00 to 10.50
Wrought Turnings.....	10.25 to 10.75
Axle Turnings, Choice Heavy.....	12.50 to 13.00
Cast Borings.....	7.50 to 8.00
Stove Plate.....	12.25 to 12.50
Wrought Iron Pipe.....	13.00 to 13.50

Cincinnati.

FIFTH AND MAIN STS., April 20, 1904.—(By Telegraph.)

Pig Iron.—While more Iron is offering than has been for some days past, very little buying movement is noted, and conditions generally present a very quiet appearance. When the Steel Corporation allowed their options to lapse some time since it seems to have set the people to thinking, and they are still at it. Every one agrees that there has been very little business this week, although it is a significant fact that more Iron has been sold for delivery over the balance of the year than for quick shipment. Gray Forge is still very scarce, and agents are complaining of being unable to bid on contracts, as they cannot secure this grade in sufficient quantities. The market is holding firm at \$10, with some speculative Iron selling for \$9.75, which not only applies to this city, but also to Cleveland. One seller reports that several Southern furnaces are quoting from \$10.25 to \$10.50 for third quarter delivery, but just what this will lead to is unknown. Speaking of the general Foundry market, one of the large sellers here to-day said that while it is true that business is not moving along on the wholesale scale of last month, still it seems senseless to complain, as the market is in an exceedingly healthy condition. One of the largest sales of the week was consummated on Tuesday, and was for 2000 tons of Nos. 2 and 3 for a Detroit foundry, which rumor says was sold for a shade less than \$10, Birmingham, basis. Freight rates from Hanging Rock district to Cincinnati, \$1.15, and from Birmingham, \$2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$13.00 to \$13.25
Southern Coke, No. 2.....	12.50 to 12.75
Southern Coke, No. 3.....	12.00 to 12.25
Southern Coke, No. 4.....	11.50 to 11.75
Southern Coke, No. 1 Soft.....	13.00 to 13.25
Southern Coke, No. 2 Soft.....	12.50 to 12.75
Southern Coke, Gray Forge.....	11.50 to 11.75
Southern Coke, Mottled.....	11.25 to 11.50
Ohio Silvery, No. 1.....	16.15 to 16.40
Lake Superior Coke, No. 1.....	14.15 to 14.40
Lake Superior Coke, No. 2.....	13.65 to 13.90
Lake Superior Coke, No. 3.....	13.15 to 13.40

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	\$17.00 to \$17.50
Lake Superior Car Wheel and Malleable	17.00 to 17.50

Coke.—The market is quiet, and apparently little is doing. This is probably traceable to the fact that most consumers have their immediate wants supplied. Transportation facilities are good, and deliveries prompt. We quote, f.o.b. ovens: West Virginia Coke, \$2 to \$2.10; Connellsville, \$2 to \$2.25.

Plates and Bars.—This has been rather a quiet week for this class of material. Structural Iron inquiries are developing to some extent, and the Bar market is fairly active. Some rumors are current that there will be a slight advance made in this latter material within a short time, but

dealers are unable to verify it. We quote, f.o.b. Cincinnati: Iron Bars, in carload lots, 1.40c., with half extras; the same in smaller lots, 1.70c., with full extras; Steel Bars, in carload lots, 1.48c., with half extras; the same in smaller lots, 1.80c., with full extras; Base Angles, 1.73c., in carload lots; Beams and Channels, in carload lots, 1.73c.; Plates, 1/4-inch and heavier, 1.73c., in carload lots; in smaller lots, 2c.; Sheets, 16-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; 14-gauge, in carload lots, 1.95c.; in smaller lots, 2.50c.; Steel Tire, 3/4 x 3-16 and heavier, 1.68c., in carload lots.

Old Material.—There is no change, and dealers are not very optimistic as to the outlook. Consumers are buying in small quantities, and that only for immediate needs. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, \$11 to \$11.50 per net ton; No. 1 Cast Scrap, \$9.25 per net ton; Iron Rails, \$14.50 per gross ton; Steel Rails, rolling mill lengths, \$11 to \$11.50 per gross ton; Iron Axles, \$15 per net ton; Car Wheels, \$11 to \$11.50 per gross ton; Heavy Melting Scrap, \$11.50 per gross ton; Low Phosphorus Scrap, \$11.50 to \$12 per gross ton.

Cleveland.

CLEVELAND, OHIO, April 19, 1904.

Iron Ore.—The past week or ten days has been given over, almost entirely to the making of contracts between the Lake Carriers' Association and the various unions. A prolonged labor struggle has been removed, as a possible menace to rate making, by amicable agreement. Now the only things which hinder an immediate opening of navigation are the condition of the ice in the channels between the upper and lower lakes and the attitude of the Ore Association on prices. There is no telling when there will be an opening of the season of navigation. The ice conditions are still puzzling. As for the Ore Association, the general belief is that an understanding among the operators will prevent anything like serious overproduction, no matter what the action on prices may be.

Pig Iron.—The buying in this territory has been somewhat lighter during the past week than it has at any time for six weeks. This applies to the market as a whole. In the foundry trade the furnaces of the valleys are well filled with orders to July, and do not care to sell beyond that period. Traveling men have been withdrawn from the field, pending the settlement of the controversy over Ore prices and the establishment of the prices on Pig Iron for second half delivery. This, in part, accounts for the lighter buying of Foundry Iron, although the demand is not quite so brisk. In Basic the buying is of a hand-to-mouth nature, and seems to cover mostly small lots. In Bessemer nothing has been done. Coke prices are steady, but the railroads seem to be able to make better shipments than a short time ago. This has eased that situation greatly. Prices hold at \$2.25 to \$2.40 for good 72-hour Foundry Coke, and \$1.60 to \$1.75 for good Furnace Coke. We revise and quote Pig Iron prices as follows, f.o.b. cars Cleveland:

Northern Coke, No. 1 Foundry.....	\$14.25 to \$14.50
Northern Coke, No. 2 Foundry.....	13.75 to 14.25
Northern Coke, No. 3 Foundry.....	13.25 to 13.50
Southern Coke, No. 1 Foundry.....	14.35 to 14.60
Southern Coke, No. 2 Foundry.....	13.85 to 14.10
Southern Coke, No. 1 Soft.....	14.35 to 14.60
Southern Coke, No. 2 Soft.....	13.85 to 14.10
Jackson County, 8 per cent. Silico.....	16.50 to 17.00
Hanging Rock Charcoal, No. 1.....	23.45
Southern Charcoal, No. 1.....	19.50 to 20.00
Lake Superior Charcoal.....	16.50 to 17.00

Finished Iron and Steel.—The market displays a little easier tone. There has not been so much buying. Bars continue to lead the market, with Hoops standing a close second; but the buying even in the Bar trade does not show the amount of new orders which were coming in a short time ago. The market is represented by 1.35c., Pittsburgh, for Bessemer Steel Bars and Bar Iron, and 1.40c. for Open Hearth Steel Bars. The buying of Plates has been a little easier than of late, even though at no time this spring has the Plate trade been stiff. The call for Structural is of a little better nature, although it shows no radical improvement from the state of the market during the past few weeks. It is notable that some of the larger buyers, from whom orders of good proportions were expected, have not yet come into the market. The Billet price seemingly holds at \$23.50, Cleveland, for Bessemer, 4 x 4 inch, but this is disputed in certain circles. In Rails no new contracts have been added to the recent bookings, and it is a question when the pending inquiries will develop into sales. There is still a good call for Light Rails at \$24 to 25, Pittsburgh. The demand for Sheets has not been quite so brisk of late as it was a short time ago. The shipments have continued good, but the call for new business is not quite so strong. The prices hold as they have been at 2.50c. for No. 27 Black Sheets out of stock, and 2.25c. to 2.30c. for No. 27 in car lots at the mill. The demand for Galvanized Sheets is light and prices hold at 75, 10 and 5 off list for Nos. 16 to 20, and 75, 10 and 7 1/2 off list for No. 22 and lighter.

Old Material.—The demand for Scrap has been halting.

In some lines there is a good trade, but in others the market is weak. The trade is such that some lines have purely nominal prices. We revise and quote as follows: Old Steel Rails, \$13.50 to \$14.50; Old Car Wheels, \$13 to \$14 (nominal); Heavy Melting Steel, \$13 to \$14, all net tons; Cast Borings, \$5 to \$5.50; No. 1 Railroad Wrought, \$12.50 to \$13; No. 1 Busheling, \$11.50 to \$12.50; Wrought Turnings, \$7.50 to \$8; Iron Car Axles, \$18; No. 1 Cast, \$11 to \$12; Stove Plate, \$9.50 to \$10.50.

Birmingham.

BIRMINGHAM, ALA., April 18, 1904.

It is a very hard matter to correctly report the Iron market because of the contradictory character of the reports prevalent. Certain interests have been favored with a fair trade, and in some cases business at an advance of 25c. per ton has been declined, while others stood ready to take it on a basis of 25c. lower, say, at \$10 for No. 2 Foundry, without doing anything of consequence. Under these circumstances one is at a loss as to quotations that will not deceive. It can be taken as an established fact, though, that more Iron was sold on a basis of \$10 for No. 2 Foundry than at any of the other prices named. In one or, perhaps, two instances, there were sales of Iron on the basis of \$10.50 for No. 2 Foundry. But the condition of the sale was that the Iron had to be of a certain analysis and guaranteed. It was not sold by grade. So that while one cannot quote this sale as being made at market quotation, he cannot ignore it as one of the features of the vagaries of the market. On top of this comes the fact that No. 1 Soft sold the latter part of the week at \$11. Taking the price of the Foundry regular grades at their relative values, and this sale of No. 1 Soft would make the market value of No. 2 Foundry easily \$10.50. But at the close of the week there were sellers of this grade at \$10.

It was reported to your correspondent by sources that ought to be thoroughly posted that there were sales during the week as low as \$9.75 for No. 2 Foundry. He has no cause to dispute it, for he knows of some round lots that were taken in around \$9 for No. 2 Foundry, to be put upon the market again when a profit justified it. It is very probable that some of this Iron was marketed and paid a reasonable business profit. This condition of affairs accounts partly for the variation in prices. But most of the Iron bought at these low prices is now out of the way, and what is left will not cut much of a figure. Late on Saturday an inquiry came on the market for 300 tons of No. 1 Soft and it was priced at \$11, which means a basis of \$10.50 for No. 2 Foundry; and the seller had no doubt of the acceptance of his offer and was perfectly indifferent about its acceptance. In some instances it is almost an impossibility to fill an order, carrying an assortment of grades, all from one seller. For those grades not in hand the quotations will probably be very reasonable, but for those grades that can be supplied the prices generally are quite firm.

It looks like an anomaly in the trade that in the same market business in Iron should be refused on the basis of \$10.25 for No. 2 Foundry when it can be had on the basis of \$10. But there can be no question as to this fact, for your correspondent has seen indisputable evidence of it. The reported seller of the \$9.75 Iron will not admit it. The volume of business offered was not large. But there were several orders that ran from 1000 to 2000 tons. The largest transaction reported as concluded was for 1000 tons. From that amount the orders tapered down to car lots, and, as has been the case heretofore, they were for prompt and nearby shipment. There was some feeling of the market for the last half of the year, and one interest was credited with offering for that delivery. But they would neither affirm nor deny the assertion, and there is so little doing for that delivery that no satisfactory quotation could be obtained. As a rule, when one mentions this delivery, all intimate that it will take an advance to bring out any offerings.

At current values it is with some of the interests but a swapping of dollars to sell Iron. While those who are favorably situated can make Iron at the estimates recently published, there is a large constituency in the trade that cannot begin to cover cost with the figures named. This element cannot go on indefinitely losing money, and, unless an improvement takes place in values, there will be some more furnaces go out of blast, until it will be a question of the survival of the fittest. The cost of Ore to some of the furnaces is under 60c., while to others it runs as high as 75c. and in some cases 90c. All are trying to reduce their cost sheets to the basis of existing conditions, while with some the reduction has already reached the limit of retrenchment. This element is, of course, anxious for some advance in the market and is not favorable to the accumulation of Iron in yards. It is absolutely certain that at current values for Iron it is accumulating no profits.

The only report thus far given out concerning furnace operations for the month of March has been issued by the Sloss-Sheffield Company, who show profit from operations of \$102,041.56, from which are deducted legal and other expenses of \$5,567.35, leaving as net earnings \$96,474.21, and

showing a net surplus for the month of \$76,474.21. This can be considered as the best showing that can be made under existing conditions and under the most favorable circumstances.

The Pipe Works continue to report a flourishing condition of affairs, and the indications in the past few days point to the fact that some of them are feeling the market for delivery in the coming quarter. The base price for Pipe, based on 6-inch, is \$22, and the demand is very satisfactory. While they assert that they are pretty full of orders, they say that they could take a few more.

The West-Pratt Coal Company have applied for authority to increase their capitalization from \$20,000 to \$100,000, all paid in, and will increase largely their operations.

A new bank building is to be erected on Third avenue and other buildings are being contracted for. The prospects for this being a banner year in building construction are growing as the year advances. We have had in the past week several delegations of capitalists and officials interested in the development of our various industries, and their satisfaction is evinced in enthusiastic terms. In fact, there is no room here for croakers.

Among the various shops there has grown up a better feeling as the prospects for increasing business are developed. In one shop alone, during the past week or ten days, orders of magnitude and value have been coming, covering the Indian Territory, Oklahoma, Texas and nearby territory. They are not confined to any particular line of industry, but are so varied that they suggest a greatly improving prosperity in those territories.

The task of making a statue of Vulcan to be exhibited at the St. Louis Fair, to represent the mineral production of this State, is nearing completion and a part of it is now on the way to its destination. The whole thing complete will tip the scales at 100,000 pounds and its height will be 56 feet. To give an idea of the immense casting it takes, one car is necessary to transport the two feet and legs as high as the knees and the piece which fits immediately over the knees and covers half the thighs. The three pieces weigh 35,000 pounds, and the car that contains them is well loaded. It will take three cars to transport the casting, and, when set up, it will be a center of attraction and will be the best advertisement that was ever made to acquaint the world with the mineral riches of this industrial district. The funds necessary to complete the statue were secured by voluntary subscription from the progressive element of the various districts of the State. It is like bread thrown on the waters—sure to be returned with large interest.

Pittsburgh.

PARK BUILDING, April 20, 1904.—(By Telegraph.)

Pig Iron.—The purchase of the Clairton blast furnace and Open Hearth Steel plant by the United States Steel Corporation puts a somewhat different complexion on the Pig Iron situation. In the fact that it probably means that the Steel Corporation will not purchase Pig Iron from outside furnaces. The two Clairton furnaces that are running will turn out about 900 tons of Basic Iron per day, and while most of this will be used in the Open Hearth plant at Clairton a part of the product will be available for other plants of the Carnegie Steel Company. The third stack at Clairton will likely be started early in May, and this will give the Steel Corporation 450 to 500 tons more of Pig Iron, none of which will be needed at Clairton. The report that one of the Donora stacks of the Carnegie Company had started is untrue. It may go in early in May. The Pig Iron market is exceedingly quiet. Prices have gone off to some extent, and while Bessemer Iron for April shipment is held at \$13.35 to \$13.50, at Valley furnace, Bessemer Iron for April, May and June delivery could be bought for \$13.15, or possibly \$13, Valley furnace. Gray Forge Iron is slightly weaker, and is held at \$13 to \$13.15, Pittsburgh. A sale of about 2500 tons of Northern Forge Iron is reported at a price equal to about \$13, Pittsburgh. Foundry Iron is quiet, and Northern brands are held at \$13 to \$13.15, Valley furnace, or \$13.85 to \$14, Pittsburgh. We have advices that the Southern Pig Iron market is very firm, No. 2 Foundry being held at \$9.75 to \$10, Birmingham. The leading Southern furnace companies are said to have most of their product sold up to July 1.

Steel.—The Steel market is quiet as far as new tonnage is concerned, but the mills have a good deal of business on their books, and are pretty well fixed for the next several months. There is still some trouble in getting Sheet and Tin Bars for prompt shipment, and it is understood that the leading Steel interest will not book orders for Bars for delivery before July. We quote Bessemer and Open Hearth Billets at \$23, Pittsburgh; long Sheet and Tin Bars, \$24, and Cut Bars, \$24.50, Pittsburgh, Wheeling or Youngstown delivery.

(By Mail.)

At this writing (Tuesday, p. m.) officials of the Crucible Steel Company of America and the United States Steel Corporation, together with William G. Park and the Union Trust Company, receivers of the Clairton Steel Company, are

in session in the Frick Building, this city, and before the day is over it is practically certain that papers will be signed transferring all the properties of the Clairton Steel Company, consisting of Ore mines, Coal lands, Limestone quarries, St. Clair Terminal Railroad and the three blast furnaces and Open Hearth Steel plant, to the United States Steel Corporation. For more than a year there have been various rumors that the Steel Corporation would absorb the Clairton Steel Company, but these have always proved to be groundless, except in one case, and that was last summer, when negotiations were practically concluded and it was accepted as settled that the Clairton Steel Company had become a part of the Steel Corporation. Preliminary papers had been signed, but when it came to the final transfer of the properties the Finance Committee of the Steel Corporation refused to ratify the deal and it fell through. Shortly after this there was friction among the leading officials of the Clairton Steel Company, which resulted in the Union Trust Company and William G. Park being appointed receivers. The receivers were appointed on January 4, and the plant has been operated by them since that time. Aside from the above there have been no important developments in the Iron trade since our last report. The mooted question as to whether there will be an Ore Association this year is likely to be settled in a day or two. The Ore interests are holding a meeting in New York to-day, and there is every indication that the Ore agreement will be renewed for this year. As yet no official prices have been given out, but it is certain there will be a reduction of 35c. to 50c. a ton in prices of Mesaba Ore and from 50c. to 75c. a ton in Old Range Ores. If the Ore Association is renewed it ought to have a good general effect on the Pig Iron market in the direction of sustaining prices on Pig Iron.

The Steel market continues rather quiet, but prices are strong. All the Steel plants of the United States Steel Corporation are in full operation at the present time with the exception of the Columbus Works, the North Works at Sharon, formerly known as the Buhl Steel Company, having been started last week. The output of the Steel Corporation is now running a little over 30,000 tons of Steel Ingots per day, and the Carnegie Steel Company are filled up with business in Billets and Sheet Bars to July 1. The other Steel concerns have plenty of tonnage on their books, and the Steel business is in better shape than for some time.

The demand for Finished Iron and Steel is fairly active, but on Wire and Nails and also Pipe it is not as heavy as in March. There have been no important changes in prices, with the exception of Railway Spring Steel, prices on which were advanced on April 12 by the Crucible Steel Company.

Ferromanganese.—We continue to quote domestic Ferro, 80 per cent., at \$42 to \$42.50, delivered. Demand is rather quiet.

Muck Bar.—There is not much doing in Muck Bar, and prices are only fairly firm of the basis of \$26, Pittsburgh, for best domestic grades. There have been no large sales in this market for some time.

Wire Rods.—We quote Bessemer and Open Hearth Rods at \$31 to \$31.50, maker's mill. There is not much inquiry, due probably to the falling off in demand for Wire products.

Steel Rails.—Only small orders for Steel Rails are being placed, the large railroads persistently keeping out of the market as buyers. It is said the United States Steel Corporation have orders on hand at this time for less than 1,000,000 tons, which is only about half the tonnage sold by them last year.

Structural Material.—While no large contracts have been placed since our last report, there is considerable tonnage in sight, and much of this will be placed if there are no labor troubles. In this district work has started on the Diamond National Bank Building, but the Steel has not yet been placed. It will go either to the Carnegie Steel Company or the Jones & Laughlin Steel Company. Nothing is being done on the projected large warehouse to be built on the South Side, this city, but this may come up later. The rebuilding of the Point Bridge, in this city, will require about 500 tons. We quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.60c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared plates, 1.60c.

Plates.—The demand has improved somewhat in the past week, but the mills are still far short of having enough tonnage to keep them filled up. The car interests are doing a little more business, and are placing more orders for Plates than for some time. We quote: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers', 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price up to 3c. Plates more than 100 inches in width, 5c. extra per 100 lbs. Plates 3-16 inch in thickness, \$2 extra; gauge Nos. 7 and 8, \$3 extra; No. 9, \$5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Sheets.—Details of the settlement of the Sheet scale in

Amalgamated Sheet mills by which the men have accepted a reduction of 18 per cent. in wages on the 1903-04 scale are given elsewhere in this issue. It is not believed that this reduction in wages will have the effect of unsettling prices on Sheets, as demand is quite heavy. The leading interest and the outside Sheet mills are pretty well filled up with business for the next several months. It is said some of the Sheet mills are considerably behind in deliveries. Prices continue firm and we quote: No. 26 Black Sheets at 2.10c. to 2.15c.; No. 27, 2.15c. to 2.20c., and No. 28, 2.25c. to 2.30c., all f.o.b. at mill. The lower prices are available only on large lots. Galvanized Sheets are about 80 and 5 per cent. off, which is equal to 2.85c. for No. 26, 3.04c. for No. 27, and 3.23c. for No. 28. For small lots from store jobbers charge the usual advance over these prices.

Iron and Steel Bars.—The mills rolling Iron and Steel Bars are better filled up with tonnage than for several months. The demand for both Iron and Steel Bars is fairly active, and a number of contracts have been placed running through second and third quarters. We quote Iron Bars at 1.40c., Pittsburgh, and Steel Bars at 1.35c., Pittsburgh, in carload and larger lots, with the usual differentials for less than carloads. On Open Hearth Bars \$1 a ton advance is charged.

Hoops and Cotton Ties.—The price of Steel Hoops is very firm on the basis of 1.40c., Pittsburgh, and Steel Bands are 1.35c., extras as per Steel card. One leading mill is out of the market on Cotton Ties, having all the tonnage it can take care of for delivery this season. The other two interests are also well filled up. Prices of Cotton Ties remain on the basis of 80c. per bundle in 3000 bundle lots and over, and 83c. per bundle for less quantities. A number of contracts on which the mills are now working were placed at lower prices.

Merchant Pipe.—The Pipe mills are very busy on orders placed some time ago, and demand at present is fair, but not as heavy as last month. With the advent of good weather, allowing outside operations, demand for Pipe is expected to improve. Prices are fairly firm, discounts to consumers in carloads being as follows:

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
Per cent. Per cent. Per cent. Per cent.				
1/8, 1/4 and 3/8 inch.....	68	58	66	56
1/2 inch.....	71	61	69	59
3/4 to 6 inches.....	75	65	73	63
7 to 12 inches.....	71	61	68	58
Extra strong, plain ends, 1/2 to 8 inches.....	67	57	64	54
Double extra strong, plain ends, 1/2 to 8 inches.....	59	49	56	46

Boiler Tubes.—The demand for Boiler Tubes is only fair, and some of the mills are shading prices slightly in order to secure tonnage. This is usually the case in this product when the demand is not large enough to give the mills full work. Discounts to consumers in carloads, which are being shaded more or less, are as follows:

	Steel.	Iron.
1 to 1 1/2 inches.....	42 1/2	39
1 3/4 to 2 1/4 inches.....	55 1/2	38
2 1/2 inches.....	58	43
2 3/4 to 5 inches.....	64 1/2	50 1/2
6 to 13 inches.....	55 1/2	38

Merchant Steel.—A number of good sized contracts have been placed by implement makers for delivery all through this year, and in some cases into next year. General tonnage is not as heavy as in March, but the mills are well filled up, and shipments this month will be heavy. The Crucible Steel Company advanced prices on Railway Spring Steel on April 12. Prices are firm and we quote: Hexagon Steel Bars, 1.60c. for Bessemer and 1.65c. for Open Hearth; Plow Steel, 6-inch and under, 1.40c. for Bessemer and 1.45c. for Open Hearth; Plow Slabs, 1/4-inch and heavier, 1.65c.; Tire Steel, smooth finish, 3/4 x 3-16 and larger, 1.65c. flat; Toe Calk, 1.90c.; Carriage Spring Steel, 1.75c. The demand for Shafting is quite heavy, and the mills have more tonnage on their books than for several months. We quote at 52 per cent. off in carloads and 47 per cent. in less than carloads, delivered in base territory. A meeting of the Shafting manufacturers was held last week, at which prices were reaffirmed on the basis of 52 per cent. off in carloads, and 47 per cent. in less than carloads delivered in base territory.

Tin Plate.—The demand for Tin Plate continues heavy and the leading mills are filled up for the next several months. The settlement of the Tin Plate wage scale prohibits any labor troubles in the mills until June 30 at least. We quote 100-lb. Coke Terns at \$3.40 per box, f.o.b. Pittsburgh.

Spelter.—Prices on Spelter remain firm, and there is quite a good demand. We quote best grades of Prime Western Spelter at 5.13 1/2c. to 5.18 1/2c., Pittsburgh. We note a sale of 25 tons of Prime Western Spelter at 5.16c., Pittsburgh.

Iron and Steel Scrap.—The movement in Scrap is light and prices on the whole are weak. Heavy Melting Scrap is held at \$13.75 to \$14 in gross tons, but on a firm offer and

a good sized lot it is probable \$13.50 could be done. Mal-leable Scrap is held at \$11.50 in gross tons, and Old Car Wheels at \$12.25 to \$12.50, in gross tons. There is very little demand for the latter. Old Steel Rails, short pieces, are held at \$13.75 to \$14, gross tons; Rerolling Rails are \$15.50, gross tons; Busheling Scrap, \$11, net tons; No. 1 Wrought Scrap, \$13 to \$13.25, net tons; No. 1 Wrought Scrap, \$13 to \$13.25, net tons; Cast Iron Borings, \$6.75 to \$7, gross tons; Iron Car Axles, \$19.50 to \$20, gross tons; Steel Car Axles, \$17.50 to \$18, gross tons, and Sheet Scrap, \$11.25 to \$11.50 in gross tons. All the above prices are f.o.b. Pittsburgh.

Coke.—The demand for both Furnace and Foundry Coke is very active, and with a good car supply shipments have been heavy, averaging about 2000 cars a day out of the Connellsville region. Stocks of Coke piled up during the car shortage are being rapidly diminished. It is claimed that a large order for about 15,000 tons of 72-hour Foundry Coke, deliveries running into next year, was recently placed at about \$2 a ton at oven. For shipment in the next three to six months strictly Connellsville 72-hour Foundry Coke is held at \$2.15 to \$2.25 a ton, while some producers whose Foundry Coke has an established reputation are able to get upward of \$2.50 a ton for it. Connellsville Furnace Coke for shipment in the next month or two is held at about \$1.60 a ton at oven. Outside makes of Furnace and Foundry Coke sell at lower prices, Furnace Coke being sold at \$1.45 to \$1.50, and Foundry \$1.85 to \$2 a ton at oven. Out of about 28,500 ovens in the Upper and Lower Connellsville region about 22,500 were active last week.

Trade Publications.

Sheets and Tin Plates.—The American Sheet & Tin Plate Company have issued two booklets which will be of much interest to all persons connected with the metal and building trades. One of these booklets contains a brief history of iron and its application to roofing, and traces the manufacture of roofing tin from the early days to the present time. It also gives a full description of "How to Construct a Tin Roof," and a great deal of other valuable information which will be found useful to every person connected with the building trade. The other booklet contains handsome illustrations of a number of the important sheet mills owned by the American Sheet & Tin Plate Company; also tables showing weights of sheets and bundles of standard sizes of galvanized sheets, black sheets, and net prices per pound and per square foot at given rates of discounts, &c. Copies of these booklets may be obtained by addressing W. C. Cronmeyer, advertising agent, American Sheet & Tin Plate Company, 310 Carnegie Building, Pittsburgh.

Centrifugal Pumps.—Centrifugal pumps of turbine, volute and conoidal form for heads up to 2000 feet are described in Catalogue W-50 from Henry R. Worthington, New York. Of the first form, turbine pumps, illustrations are given of a 36-inch pump, having a capacity of 35,000 gallons per minute against a 160-foot head; a five-stage turbine pump for deep mine and other service requiring heads up to 750 feet; four-stage and two-stage turbine pumps, with various means for driving; turbine sinking pumps, and vertical and single two-stage turbine pumps. Under conoidal pumps, which are specially intended for pumping out excavations, irrigation, &c., several forms are illustrated with belt and direct connected motor drive. The volute pumps are specially adapted for service in or about buildings, for house tank service, supplying cooling water to condensers, for water works, for filtration, and, in other words, services where a considerable quantity of water is required to be pumped against a moderate pressure. Another pump shown of the volute form is designed for dredging purposes, where the liquids handled contain a large percentage of solid matter.

Wire Rope Tramways.—Automatic aerial wire rope tramways are described in a catalogue from Hallidie-Painter Tramway Company, 46 Fremont street, San Francisco, Cal. Illustrations are given of various systems of both single and double rope types. Patent pulleys, terminal structures, intermediate supports, buckets and carriers in various forms are also described. As special systems are shown tramways for the transporting of railroad cars with their loads across a canyon where a bridge would hardly be feasible; an excavating system where scrapers are used for carriers in conjunction with plows, and the great incline railway on Mt. Lowe, Pasadena, Cal.

Corliss Engines and High Pressure Boilers.—Catalogue No. 55 from the Murray Iron Works Company, Burlington, Iowa, is a 62-page book, beautifully illustrated and arranged. The features are a line of Corliss engines for various services, from ordinary light service, where an engine smaller than 18 x 42 inches is sufficient, up to 30 x 48 inch rolling mill type engines for high pressure and high speed. Following the descriptions, with tables of sizes of the engines themselves, are given detail views with explanatory text of the several detail parts—cylinders, governors, pistons, cross heads, connecting rods, pillow blocks, valve gearing, dash pots and special features. A few illustrations follow showing the engine in practical application. The latter part of the book is devoted to cross and tandem compound engines, two-stage compound Corliss air compressors, high pressure Murray boilers and Murray feed water heaters.

New York.

NEW YORK, April 20, 1904.

Pig Iron.—Northern makers have made a number of fair sales during the past week in this territory, but in some instances the competition has again been keen and somewhat lower figures have been named. In most cases the iron is wanted for delivery during the second quarter, but there have been sales also extending into the third quarter. We quote Northern No. 1 Foundry, \$15.50 to \$16; No. 2 Foundry, 15 to 15.50; No. 2 Plain, \$14.50 to \$14.75, and Gray Forge, \$13.75 to \$14.25, tidewater. Tennessee and Alabama brands are quoted \$13.75 to \$14 for No. 2 Foundry and \$13.25 to \$13.50 for No. 3 Foundry.

Steel Rails.—The market continues quiet. A part of the Pennsylvania order placed last year has been switched over to meet the requirements of the Norfolk & Western Railroad. In this way the cutting down of the Pennsylvania order by 10 per cent., which was reserved by the terms of the contract, has been partly compensated for to the mills. We continue to quote \$28 at mill for Standard Sections.

Cast Iron Pipe.—Manufacturers are awaiting with much interest the appearance of specifications for part of the high pressure salt water fire protection system for this city. It is expected that the specifications will be issued within the coming 30 days. Quite a considerable tonnage will probably be needed for the part of the work to be undertaken first. The general condition of trade is quite satisfactory, manufacturers being in frequent receipt of orders of fair size. Some of the foundries are stiffening in their prices as a result of the volume of business now on their books, but carload lots continue to be quoted at \$28 per gross ton for 6 to 10 inch, and \$27 for 12 inch upward, at tidewater. Special prices are made on large lots.

Finished Iron and Steel.—The American Bridge Company are confident that the current month will show a considerably larger tonnage of actual orders than March. They report small orders coming in very freely from all parts of the country. Occasionally a good contract is secured. They will furnish the steel for the new Chicago & Northwestern Railway Building in Chicago, which will require 4500 tons, having secured the order from the general contractors, the George A. Fuller Company. They have also received 1000 tons for an addition to the Bellevue-Stratford Hotel in Philadelphia. A much more cheerful tone prevails in the building line, especially outside of New York City. Here it is feared that labor troubles have not completely ended. Contractors are looking forward to May 1 with considerable apprehension. The activity in the Structural line is almost entirely confined to buildings, bridge work being quite dull. The Plate trade is quiet, the most important business coming up this week being 200 tons for the Navy Yard. Local trade covers rather small quantities, but the Eastern mills report a fair condition of orders booked, as they are receiving much more business from other localities. The Bar trade is in much better shape than other branches of the Finished Iron and Steel trades. The mills are pressed for deliveries on contracts and are getting fresh business in good volume. Prices are firmly maintained. We quote at tidewater as follows: Beams, Channels, Angles and Zees, 1.74½c. to 2c.; Tees, 1.79½c. to 2c.; Bulb Angles and Deck Beams, 1.84½c. to 2.05c. Sheared Plates in carload lots are 1.74½c. to 1.85c. for Tank, 1.84½c. to 2c. for Flange, 1.94½c. to 2.10c. for Marine and 1.94½c. to 2.50c. for Fire Box, according to specifications. Refined Bar Iron and Soft Steel Bars, 1.49½c.

Old Material.—Although Re-rolling Steel Rails are reported more plentiful in the West, they are still exceedingly scarce here and prices are firmly maintained. Some business has been done in Relaying Rails, but the orders for that class of material have called for special sizes, ordinary sections being neglected. Cast Scrap is weak, especially in localities which can be reached easily from Baltimore, as large quantities are now available from that point, as salvage from the recent fire. Old Car Wheels continue particularly slow of sale. Prices are quoted at tidewater as follows, per gross ton, New York and vicinity:

Old Iron Rails.....	\$17.50 to \$18.50
Old Steel Rails, long lengths.....	15.50 to 16.00
Old Steel Rails, short pieces.....	12.50 to 13.00
Relaying Rails.....	18.00 to 19.00
Old Car Wheels.....	12.50 to 13.00
Old Iron Car Axles.....	18.00 to 18.50
Old Steel Car Axles.....	15.00 to 15.50
Heavy Melting Steel Scrap.....	12.00 to 12.50
No. 1 Railroad Wrought Iron.....	16.00 to 16.50
Iron Track Scrap.....	15.00 to 15.50
Wrought Pipe.....	11.50 to 12.00
Ordinary Light Iron.....	8.00 to 8.50
Cast Borings.....	5.50 to 6.00
Wrought Turnings.....	8.00 to 8.50
No. 1 Machinery Cast.....	12.50 to 13.00
Store Plate.....	10.00 to 10.50

The New York offices of Matthew Addy & Co., E. B. Blandy, manager, have been removed to Room 52, Smith Building, 15 Cortlandt street.

Metal Market.

NEW YORK, April 20, 1904.

Pig Tin.—Arrivals have continued to come in in good volume, and if there has been any change in demand it has been a lessening rather than an increase. As a result there has been a natural weakening of the situation here, prices going off a shade. In London, however, there was a slight advance over last week's quotations. At the close to-day spot was quoted 27.87½c. to 28.12½c., the former figure standing for actual transactions. May delivery can be bought for 27.75c. The London market advanced 2 shillings 6 pence on spot to £127 2s. 6d., and futures are quoted £126 15s., showing a decline of 5 shillings as compared with last week. The shipments from the Straits for the first half of this month show an increase of 1100 tons above the corresponding period of last year. The arrivals thus far this month amount to 3460 tons, and the afloats are figured at 2194 tons.

Copper.—Is quiet and without change. Prices, as quoted for the last few weeks, are still maintained, and the situation promises no new feature of interest. The producers' "official" figures are as follows: Lake, 13.12½c. to 13.37½c.; Electrolytic, 13.12½c. to 13.25c., and Castings, 12.87½c. to 13.12½c. Consumers are still holding out of the market, buying only on a hand-to-mouth basis. The London market shows a slight advance, and is quoted to-day as follows: Spot, £57 18s. 9d.; futures, £57 15s.; Best Selected, £62 15s. The exports so far this month have run considerably below the volume of last month, amounting to date to but 8200 tons.

Pig Lead.—A general easing off is in evidence. While the movement has not as yet affected the principal producers' prices, a decline from this quarter is looked for in the trade. The spot market here is also unchanged, but offers of shipments for the West are being made at reduced figures. The St. Louis and London markets show declines. The American Smelting & Refining Company quote on a basis of 4.50c. for 50-ton lots of Desilverized, shipment within 30 days. Quotations here for spot, ex store, are unchanged at 4.60c. to 4.65c. Shipments can be had for 4.50c. St. Louis is easy at 4.40c., and London cables £12 2s. 6d.

Spelter.—Is easier here, unchanged in St. Louis, and a shade firmer in London. Spot and delivery for the balance of this month are quoted 5.20c. to 5.25c. St. Louis telegraphs 5.05c. to 5.10c., and the London cable names £22 7s. 6d. As for demand and general conditions, there is no change.

Antimony.—The market is quiet, but prices rule firm, in view of the likelihood of Japanese supplies being restricted by the war conditions. At the close to-day Cookson's was quoted at 7¼c. to 8c., Hallett's at 7¼c. to 7½c., and other brands at 6¼c. to 6½c.

Nickel.—This metal is firmly held, with the usual volume of business passing. Large lots are quoted at 40c. to 45c., and smaller quantities at 50c. to 60c.

Quicksilver.—While the demand is not active, supplies are somewhat light, and the tone of the market is steady. Flasks of 76½ lbs. are quoted at \$47 to \$47.50. London price is unchanged at £8 5s.

Tin Plate.—No change is noted in this market. A fair volume of business is reported to be coming to the mills from consumers. The settlement of the question of wage scale without trouble has set consumers at rest, and such as have not already laid in large stocks for the future are coming forward with their usual requirements. Quotations are firm and unchanged, on the basis of \$3.45 per box for 14 x 20 100-lb. Cokes, f.o.b. mill, equivalent to \$3.64, New York. The Swansea market has advanced 1½ pence to 11 shillings 7½ pence.

The Ore Dust Case.—PITTSBURGH, Pa., April 20, 1904. —The Supreme Court has refused a reargument in the ore dust case of the Jones & Laughlin Steel Company. The courts at Pittsburgh have made the final order in the case, notifying the company to abate the ore dust at once. Willis L. King, vice-president of the company, states that the company will do all in its power to carry out the order of the court.

The Lake Erie & Ft. Wayne Railway Company have been incorporated at Ft. Wayne, Ind., with \$15,000 capital, with the Ft. Wayne Iron & Steel Company, the chief stockholder. The company will construct a road 25 miles long, beginning at the steel company plant and going partly around the city. The directors are E. F. Yarnelle, John W. Sale, H. C. Rockhill, Chas. H. Rawlins, John P. Evans, Robt. Millard, B. Paul Mossman, W. J. Vesey.

One hundred iron molders have struck at the plant of the Norway Steel Company, in York, Pa., as the result of a 10 per cent. reduction in wages. The management asserts that dullness in the iron trade has made the cut necessary.

The Sale of the Clairton Steel Company.

(By Telegraph.)

PITTSBURGH, PA., April 20, 1904.—While the final papers for the sale of the Clairton Steel Company properties to the United States Steel Corporation have not yet been signed, the transaction is expected to be closed to-day. The negotiations are being conducted on the part of the Crucible Steel Company by the Union Trust Company and W. G. Park, receivers of the Clairton Steel Company. While all the terms of the sale have not been made public, we can state that the United States Steel Corporation will not have to expend one cent in cash for the purchase of the Clairton plant. Briefly the terms of the sale are these: The Steel Corporation assume and guarantee the interest on \$10,250,000 of Clairton Steel Company 5 per cent. bonds held by the Union Trust Company, Pittsburgh, receivers. In addition the Steel Corporation turn over to the Crucible Steel Company \$1,000,000 of their second mortgage bonds. These are quoted to-day at about 78, and if sold by the Crucible Steel Company would net about \$780,000. On the other hand, the Crucible Steel Company must assume and pay over \$2,000,000 in debts of the Clairton Steel Company, and in addition the Crucible Steel Company cancel about \$2,000,000 in debts owed to them by the Clairton Steel Company. The Steel Corporation pay for the coal and ore properties, the limestone quarries and the St. Clair Terminal Railroad, all owned by the Clairton Steel Company, exactly what these properties cost the Clairton Company. From this it will be seen that the Steel Corporation get a good bargain. The building and operation of the Clairton Steel Company blast furnaces and open hearth steel plant have been a heavy expense to the Crucible Steel Company. The property consists of three blast furnaces, 20 x 85 feet, two of which are in operation, the second stack having started last week. The third stack has never been quite completed, but is expected to be ready for blast in May. The open hearth plant contains 12 50-ton furnaces, a 40-inch blooming mill, billet mills and other equipment. Recently there was added a small billet mill for turning out 1½-inch billets. Good records for output have been made in the open hearth plant in the last few months. In January it turned out 23,600 tons, in February 29,900 tons and in March 31,800 tons of billets. The Steel Corporation expect to take possession of the plant on May 1. Nearly half the output of billets of the Clairton plant goes to the Pittsburgh Steel Company at Monessen, under a long time contract based on the price of pig iron. The balance of the product, aside from that used by the Crucible Steel Company, is sold in the open market. It is understood that one of the conditions of the sale is that the Steel Corporation is to furnish the Crucible Steel Company their entire requirements of Bessemer and open hearth billets, under a sliding scale contract. The Steel Corporation have been furnishing Bessemer billets to the Crucible Steel Company under such a contract for several years. The sale of the Clairton Steel Company has given rise to the report that it may allow the Crucible Steel Company soon to resume paying dividends on the preferred stock, which were suspended last year. This, however, is hardly probable.

The Imperial Steel & Wire Company of Collingwood, Canada, are in the market for a complete equipment for a 50-ton wire plant, including cleaning house, drawing frames and galvanizing plant; also for a 25-ton unit wire nail plant. The buildings of the company are about completed.

On April 19 a fire, which started in a factory on Wellington street, Toronto, Ontario, swept through the wholesale business section of that city, causing a loss estimated at \$10,000,000. A large area was burned, and a great many business buildings and factories have been destroyed.

The Central Trust Company, Indianapolis, Ind., have been appointed receivers for the Indianapolis Staple & Tack Company.

Iron and Industrial Stocks.

The most important occurrences of the week were the passing of the dividend of the Allis-Chalmers Company and the Chicago Pneumatic Tool Company. In both instances the cause assigned is the desirability of the accumulation of a larger surplus. The negotiations for the sale of the Clairton Steel Company to the United States Steel Corporation had a marked effect on the preferred stock of the Crucible Steel Company of America, which rose from 35¼ on Friday to 45 on Monday, from which there was a slight recession. United States Steel stocks, which had been firm for the greater part of the week, the preferred selling up to 61½ on Monday, the last day before the closing of the books for the dividend, were made the subject of an attack by the bears on Tuesday, and the preferred sold down to 57¼, ex dividend, and the common down to 10½. Other changes in prices of industrial stocks were very slight. The last transactions up to 1.30 on Wednesday were at the following figures: Car & Foundry common 18½, preferred 72; Locomotive common 20½, preferred 81; Colorado Fuel 31; Pressed Steel common 27, preferred 71; Railway Spring common 20¼, preferred 74½; Republic common 7½, preferred 45¼; Sloss-Sheffield common 39¼, preferred 84; Tennessee Coal 38; United States Steel common 10½, preferred 57, new 5 per cent. bonds 77¼.

The directors of the Chicago Pneumatic Tool Company decided on April 13 to suspend dividends for the present. The company have an authorized capital of \$7,500,000, of which \$6,013,600 is outstanding; also a bonded debt of \$2,500,000. Dividends of 2 per cent. quarterly were paid from April, 1902, to January, 1903, both inclusive; in June, 1903, 1¼ per cent. was paid, the deferred April dividend; July, 1¼ per cent.; October, 1¼ per cent.; 1904, January, ¼ per cent., making 6 per cent. for the year. According to statements now current, the old method of adhering to a fixed dividend rate has been dropped, and the policy of the company hereafter will be to pay dividends as they have been earned, and as it is considered advisable to pay them. Meanwhile it has been deemed prudent to accumulate a surplus.

While no formal action has been taken on the matter, the directors of the Allis-Chalmers Company have allowed the usual time for the declaration of the quarterly dividend on the preferred stock to go by without declaring it, and the inference is drawn that it is their intention to suspend the dividend for some time to come. The following statement published by one of the news agencies on the question of the dividend, although not official, was looked upon as authoritative: "The Allis-Chalmers Company have recently decided to extend their operations into the electrical field. This necessitates a general reorganization of the company's manufacturing staff. In view of the depression in business over the East, we do not think it wise to burden our new staff with the preferred dividend until the company have firmly intrenched themselves in their new field, and until general business conditions are more buoyant. We shall husband our resources."

Dividends.—The regular semiannual dividend of 3½ per cent. on the preferred stock of Henry R. Worthington, Incorporated, will be paid May 2.

The Pittsburgh Coal Company of Pittsburgh have declared a cash dividend of 1¼ per cent. on the preferred stock, payable April 25. The last dividend declared by this company was in scrip, which will likely be redeemed for cash in the near future.

National Steel & Wire Company have declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable to stockholders of record April 30.

The blooming mill engine of the rod mill at Joliet broke down last week and temporarily stopped operations. So close was the supply of rods for the wire mills of the district that a supply of rods was at once ordered from the Pittsburgh district. On Tuesday the mill was again in operation, the blooming mill being driven by the engine of an adjoining finishing mill connected through the mill building.

The E. P. Allis Mutual Aid Society held its twenty-first annual election of officers at Milwaukee on April 11, re-electing its former officers as follows: President, Edwin Reynolds; treasurer, Charles Allis; secretary, W. T. Saveland. The society was organized by the late Edward P. Allis for the benefit of the employees of the E. P. Allis Company, and has been continued under the consolidation of the Allis-Chalmers Company for Milwaukee employees. The society collects monthly assessments and pays sick benefits, and in case of death \$100 to a member's estate. During the 20 years of its existence it has disbursed thousands of dollars in this way, and been a decided factor in maintaining pleasant and mutually profitable relations between employees and employers. At present the society has 1510 members.

The New York Machinery Market.

NEW YORK, April 20, 1904.

No developments of unusual importance can be noted as fruits of the week under review. In fact, the pending transactions to which the trade have pinned a good deal of faith have shown a marked lack of activity in the direction of consummation. This condition has not assumed a stage, however, causing any great apprehension as to a possibility of these matters falling through. That machinery builders and merchants are not greatly alarmed over the business outlook, despite the present quietness, is evidenced by the firmness with which prices are being held at present.

In the machine tool trade considerable interest is being taken in the meeting of the National Machine Tool Builders' Association, which is to be held in Cincinnati beginning next Tuesday, the 26th inst. The general opinion expressed in the trade here is that there is no occasion at present for any change in prices.

All matters in connection with the Pennsylvania Railroad Tunnel project are still hanging in about the same position as they were a week ago.

Nothing has transpired in connection with the contemplated purchases of machinery by the Japanese Government, which we referred to last week.

A matter has come up within the last few days which carries much more importance than is evident on its face. It was the award of a large contract for lighting apparatus to one of the great New York building construction companies. This is taken in the trade as an indication that the company involved are intrenching themselves, so that in time they will be in a position to take contracts for the construction and equipment of great power stations and industrial establishments, as well as the office and similar structures which they have been building for some time.

The transaction referred to is the award of the contract for the engines, generators and electric wiring and equipment of the great new department store which is being constructed in New York by John Wanamaker to the Thompson-Starrett Company of 49 Wall street, New York. The amount involved in this contract is about \$200,000. It calls for six 300-kw. generating sets, as well as the wiring and all electrical appurtenances. The Thompson-Starrett Company are now in the market for the engines, generators and accessories required for the fulfillment of the contract. The boilers, we are informed, were awarded to the Babcock & Wilcox Company of 85 Liberty street.

We are informed that the contracts for the construction and mechanical equipment of the new Wanamaker store, to be erected in Philadelphia, will soon be let. Bids for a portion of the work will be received in Philadelphia to-morrow. This store is to be three times the size of the present buildings, and the mechanical equipment will doubtless be greater than that for the New York store.

Affairs are now approaching the point when the Ferracute Machine Company, Bridgeton, N. J., will settle on the details of equipment for their new plant. These have not yet been definitely decided, and only in a general way has the machinery end of the project been considered. We are informed by Oberlin Smith, president and mechanical engineer of the company, that it is their intention to install some of the tools now in their temporary shops and also some new ones. All tools are to be individually motor driven, and the total horse-power of the power plant will be upward of 200. The buildings, which are now in course of erection, will be fire proof, and will be equipped with the most modern machinery. The machine shop will be 100 x 200 feet, of absolutely fire proof construction, with no wood work in it of any kind, the floor being concrete, the frame work, window frames, sashes, doors, &c., of steel, and the roof of tiles and ribbed glass. There will also be a one-story brick building, 30 x 185 feet, of slow burning construction, in which will be located the power plant, carpenter shop, pattern shop and pattern storage room; forge shop, 30 x 50 feet, with steel frame and corrugated iron walls and slow burning roof; one and one-half story brick and slate office building, 50 feet square, and a one-story brick building, 33 x 63 feet, for assembly room, locker room, lavatories, &c.

George A. Rutherford & Co., Cleveland contractors, are erecting several new buildings at Lorain, Ohio, for the Baltimore & Ohio Railroad Company, to replace the buildings recently destroyed by fire. The new shops will include a car repair shop, 65 x 100 feet, frame construction; tender house, 50 x 100 feet, frame construction, and a power house, 30 x 50 feet, of brick construction.

The contracts to build the Lardner's Point Pumping Station No. 3 for the Philadelphia water works system and to install the pumping machinery have been awarded. The Holly Mfg. Company, Lockport, N. Y., secured the contract for the pumping machinery at their bid of \$427,769. There are to be three large engines, the first to be delivered in eight months. Other contracts will shortly be let for filters for the Belmont filter plant and for electric generators, driving engines and main switchboard at Lardner's Point Pumping Station No. 2.

It is reported that the Erie Railroad are to make further

extensive improvements to their shops at Middletown, N. Y. It will be recalled that the recent improvements at this point dealt chiefly with the foundry branch.

While the Lehigh Valley Railroad Company have purchased the equipment for their power plant and a portion of their new machinery equipment, the main list of machine tools has not been received in the trade as yet. This matter is now being discussed considerably in the trade, and it is thought that the list will soon be forthcoming.

The sale of the large plant of the Jenkins Iron & Tool Company, Bellefonte, Pa., has been postponed until April 26. The property to be sold includes 15 acres of ground and extensive and fully equipped works, including a large rolling mill and puddle mill, chain factory, foundry implement factory, machine shop, blacksmith shop and several other buildings, besides a 250 horse-power hydraulic plant.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until April 26 for supplies for the New York Navy Yard, including three 100-kw. generating sets, and two 2½-kw. generating sets.

PERSONAL.

The Providence Engineering Works, Providence, R. I., have completed the reorganization of their management resulting from the retirement of R. H. Rice, their former secretary and treasurer, who has gone to the turbine engine department of the General Electric Company, at Lynn, Mass. President R. Austin Robertson has taken on the duties of treasurer, and Randolph T. Ode, one of the engineers of the company, has been made secretary of the corporation.

C. A. Meissner, formerly general manager of the Londonderry Iron Company, Nova Scotia, and for the last four years mineral engineer in charge of prospecting, mining and quarrying, &c., of the Dominion Iron & Steel Company, has accepted the position of assistant to the executive of the Londonderry Iron & Mining Company, Limited, Londonderry, Nova Scotia, and the Canada Iron Furnace Company, Montreal, and will have his headquarters in the Canada Life Building, Montreal. The iron works controlled by these companies are the blast furnace plant at Londonderry, making a special grade of foundry iron; the plant at Midland, Ontario, which produces foundry iron, and the plant at Radnor, Quebec, where the Radnor carcoal iron is made.

G. L. Luetscher has resigned as superintendent of the open hearth and blooming mill of the American Tube & Stamping Company, Bridgeport, Conn.

Harry J. Koch, for some time assistant secretary of the Buffalo Chamber of Commerce, has accepted the business management of the plant of the American Steel Foundries at Sharon, Pa., and will at once enter upon the duties of his new position.

William J. Bassett has resigned as secretary of the Eastern Steel Company, Pottsville, Pa., and has taken charge of the office of E. Dreifus & Co., scrap dealers, Arcade Building, Philadelphia.

Frank S. Witherbee and C. M. Schoonmaker, directors of the Tennessee Coal, Iron & Railroad Company, have spent the last week in the Birmingham district.

Charles M. Schwab is visiting the Tonopah mining country in Nevada with a party of friends.

F. A. Geler, treasurer of the National Metal Trades Association and president of the Cincinnati Milling Machine Company, sailed from England for this country on April 10.

Christian Flinn, superintendent of the Allegheny works of the Pressed Steel Car Company, has been appointed assistant manager of all the company's car plants.

Albert Patton has resigned his position at the Ohio works of the Carnegie Steel Company, Youngstown, Ohio, to become superintendent of the converting department of the Bessemer steel plant of the Lackawanna Steel Company, Buffalo, N. Y.

Carl Horix, formerly general manager of the George B. Sennett Company, Youngstown, Ohio, has resigned to accept the position of sales manager of the Curtis Mfg. Company of St. Louis.

R. V. Norris has resigned as chief engineer of the coal and water companies of the Pennsylvania Railroad

Company, with whom he has been connected for the past 18 years, and by whom he has been retained as consulting engineer. Mr. Norris has opened offices at 99 John street, New York, and at Wilkes-Barre, Pa.

H. R. Hume, formerly with Chas. Worthington, consulting engineer, has accepted a position with the Rust Boiler Company, Pittsburgh.

Measures in Aid of the Merchant Marine.

WASHINGTON, D. C., April 19, 1904.—The Congressional leaders are planning to complete during the current week the entire legislative programme providing aid for the American merchant marine. This programme involved the passage of three important measures—namely, the bill appointing a commission to investigate the necessity of special legislation in the interest of the shipbuilders and shipowners of the country, the extension of the coastwise laws of the United States to the Philippine Islands, and a measure requiring military and naval supplies to be shipped in American bottoms.

Extending the Coastwise Laws.

The bill extending the coastwise laws to the Philippines was introduced early in the session by Senator Frye of Maine, and referred to the Committee on the Philippines. The sentiment in favor of the bill was so strong that the opposition was forced to succumb and the bill passed the Senate by a handsome majority. When the measure was taken up on the floor of the House a successful effort was made to harmonize all conflicting interests and this was accomplished by the adoption of an amendment postponing the taking effect of the bill until July 1, 1906. The measure is now in the hands of the President, and will undoubtedly be approved within a few days.

The bill requiring Government stores of all kinds to be shipped in American bottoms also originated in the Senate and was referred to the Committee on Commerce.

This bill was scrutinized very closely by the officials of the War and Navy Departments, but the provision permitting the President to suspend the proposed law in his discretion was accepted as furnishing a sufficient safeguard to the Government, and after a lively debate in the Senate it was passed and sent to the House. Hearings on this measure were recently held before the House committee after which it was favorably reported and is now on the calendar. It will be called up before the end of the current week and will be passed by a comfortable majority.

The most important of all these measures, from the standpoint of those who advocate the payment of direct subsidies to the American merchant marine, is the so-called commission bill. This bill was introduced in the House by Representative Gardner of Massachusetts and referred to the Committee on the Merchant Marine and Fisheries, which gave extended hearings upon it. It was then reported to the House and placed on the calendar. Several weeks ago Representative Grosvenor, chairman of the House committee, applied to the Committee on Rules for a special order for the consideration of the commission bill, and this proposition has been agreed to, the 20th inst. being selected as the date for the discussion of the bill in the House. A careful canvas made by the friends of the measure indicates that it will pass by a majority of at least 25, even assuming that the minority vote solidly against it.

The commission bill was introduced in the Senate by Senator Frye on the 16th inst., referred to the Commerce Committee and reported with a favorable recommendation the following day. It is now on the Senate calendar and will doubtless be taken up within the course of a few days. In case either house passes this bill before the other, the measure acted upon will be substituted for the bill pending in the other house and, as no amendments are likely to be added, reference to conference committee will thus be avoided and the bill can be sent to the President with little or no delay.

Senator Hale of Maine made a vigorous effort on the 16th inst. to have incorporated in the bill for the government of the Panama canal zone an amendment requiring

men, materials and supplies to be shipped to the Isthmus in American vessels. Some opposition being manifested, he withdrew the amendment, but gave notice that at the next session he would renew his efforts to have it enacted into law. It is understood that the coastwise laws of the United States will be extended to the canal zone and the entire tract treated as though it were American soil.

W. L. C.

OBITUARY.

FRANK B. KEMPSMITH.

Frank B. Kempsmith, the originator and designer of the well-known Kempsmith milling machine, died at his home in Milwaukee, Wis., on April 10, aged 56 years. Mr. Kempsmith began his mechanical career at an early age, and developed into a brainy and skillful workman. He had a high appreciation of the requirements of machine tools, and was highly thought of by machine tool builders. He worked at different times and in different capacities for Brown and Sharpe and the Garvin Machine Company, and for some time was superintendent of the shops of Warner & Swasey, Cleveland. Sixteen years ago, realizing the great possibilities and field for a high-grade milling machine, he moved to Milwaukee and designed and manufactured the machine which bears his name. Under his watchful care and his principle of having nothing but the best, this small beginning was developed into the modern and useful machine of to-day. He had been failing in health for some time, and owing to this he retired from active business three years ago.

NOTES.

AMOS K. TAPPAN, for more than 25 years a manufacturer of steam pumps at 105 South Canal street, Chicago, died April 10, at his home, in that city, after a brief illness. Captain Tappan was a veteran of the Civil War.

RICHARD L. T. EVANS, who for the past two years has been the president of the Dover Stamping & Mfg. Company, Cambridge, Mass., and who formerly for many years was the manager of the Fairbanks Company in Boston, died of pneumonia at his home at Phillips' Beach, Swampscott, Mass., on March 28, after a short illness, at the age of 50 years. He was a Free Mason and a member of the Episcopalian Club and Eastern Yacht Club. He is survived by an only daughter.

D. W. C. CARROLL, a former well-known iron manufacturer of Pittsburgh, died at his residence in that city last week. Mr. Carroll was born in Pittsburgh in 1829, and had lived in that city ever since. At one time he was connected with the Carroll-Porter Boiler & Tank Company, and also with the Magnetic Boiler Tube Cleaner Company.

OLIVER SMITH KELLY, head of the O. S. Kelly Company, Springfield, Ohio, manufacturers of threshing machines and road rollers, died April 11, at his home in that city, aged 82 years. He was born in Clark County, Ohio, and learned the trade of a carpenter. In 1849 he went to California, and in the gold fields laid the foundation of a fortune. Returning to Ohio in 1856 he began the manufacture of reapers and mowing machines with W. N. Whiteley and Jerome Fassier. Later he organized the O. S. Kelly Company, which became one of the largest industrial concerns of its kind.

JOHN McCRAE, for many years foreman of Robert Wetherill & Co.'s boiler shops at Chester, Pa., died April 17, aged 60 years.

JAMES L. TELLER, for 34 years secretary and treasurer of the Fishkill Landing Machine Works, Fishkill Landing, N. Y., died April 18, at his home in Newburgh, N. Y., from paralysis, aged 66 years.

THOMAS ALLEN, president of the Allen Cornice & Corrugated Iron Works and long prominent in the corrugated iron business, died April 12 at his home in Chicago, aged 67 years. Mr. Allen was born in Philadelphia. He removed to Chicago in 1882 and engaged in the manufacture of corrugated iron. His business grew rapidly and later was taken over by the company of which he was president at the time of his death.

HARDWARE.

FOR several years the competition of catalogue houses has been a factor in the trade, more and more forcing itself on the attention of merchants. In its early stages the policy of silence was pursued, and those who felt most the effect of the new method of distribution seemed to think it should be discussed only in a whisper, if, indeed, it were not to be let alone altogether. There was an idea among even intelligent merchants that by ignoring it its development would be less rapid than if it were talked about and recognized. Of late, however, the subject has been discussed quite freely, especially in the associations of the retail merchants, in every one of which it has had a good share of attention. Resolutions were duly adopted and negotiations in some cases entered into with jobbers and manufacturers with a view to doing something to check it or diminish the disturbance resulting from it. Even retail merchants failed for a long time to take hold of the problem with aggressiveness, while the jobbers evinced but little interest in it, and the manufacturers, except a few to whom it came with an urgency resulting from acute relations to the question, held aloof and looked upon the change of method in the trade with apparent indifference. This easy-going policy on the part of manufacturers, jobbers, and even retailers, is now, it would seem, a thing of the past. The catalogue house business is an engrossing topic in the trade. The interest in it is evidenced by the letters we have already published and those which appear in this issue, but perhaps still more by the fact that at the coming convention of the Southern Hardware Jobbers' Association this will be one of the principal subjects considered, as arrangements have been made to have the subject presented by the president of the prominent jobbing house whose letter in our columns, April 7, precipitated the current discussion, while at the same time it is expected that the representatives of the National Retail Hardware Dealers' Association will be present by invitation to participate in the deliberations and contribute their close and intimate knowledge of the facts in the case and their suggestions as to the course to be pursued. Plans, too, have been made by those in charge of the meeting of the Southern jobbers to bring the whole subject up officially to the manufacturers in convention, to solicit their consideration of the problems involved and their co-operation in putting into effect any plans which may be deemed feasible. The whole matter thus, through the discussion of it in our columns and the attention which will be given to it by Hardware organizations, will be brought up more definitely and forcibly than ever before as a topic of commanding interest.

There is little reason to apprehend that any familiar with the course of things in the trade will regard this question as easy of solution. It is invested with peculiar difficulties and many complications. Nothing will be gained by denunciation or misrepresentation. It is necessary that anything that is done should be justified by sound business principles. The privilege of selling goods by catalogue rather than by sample or salesman must be conceded. Much will be found in the methods of these houses to command admiration, and some of them are marvels of organization and show marked ability in their management. Some of their methods, however, call for criticism and for practical, definite action, with a view to protecting interests which are interfered with or jeopardized by their competition. The best thought of the trade should be given to the problem, and jobbers,

retailers and manufacturers alike endeavor to unite on the principles on which they will work together and some wise course of action which, without encroachment on the rights of any, shall tend to correct existing abuses and improve the conditions of the trade generally. To this end the most careful preparation should be made so that at the Atlanta gathering there may be brought together not only representatives of the three classes of the trade, but carefully collected and compiled facts and figures in regard to the special form of competition which is to be discussed. Mere generalities will obviously be insufficient in attempting to reach a wise decision in the important and complicated matters involved. Between now and the time the conventions meet, jobbers, manufacturers and retail merchants should make a careful and detailed study of the publications and methods of the catalogue houses, as well as inquiry in their communities, and, as widely as possible, as to the actual character of the business transacted, the kind of goods handled, and the success with which the catalogue houses serve their customers.

It is not to be expected that the relation of the trade to the catalogue house question will be definitely determined, even theoretically, at the Atlanta conferences. It will be a matter for congratulation if a movement can be inaugurated which will secure to the subject the attention it deserves. While the Southern Hardware Jobbers' Association is one of the oldest and most respectable of the organizations of jobbing interests, it represents only a part of the country, and not all the jobbing houses in the territory covered by it are members of it. The National Hardware Association has a much larger number and, on the whole, larger houses in its membership than has the Southern Association. Some of the largest jobbing houses in the country are, however, members of neither of these, nor of any association. A great many of the smaller jobbing houses are unconnected with either of them, some of them having their own local associations. One great need in meeting this matter practically is the securing of the hearty co-operation of the entire jobbing trade. How this can be effected is one of the great questions. If the Atlanta convention can plan and start a movement which will elicit the support of the various jobbing associations, and also of the greater houses outside such associations, it will accomplish a great deal.

Meanwhile, it may be assumed that the manufacturers individually are considering the question with care, and that their association, which is so thoroughly representative, will use its influence to have its members adopt such a course in the marketing of their goods as will protect their customers in the wholesale and retail lines. In the last analysis it would seem that, after all the merchants can say or do in the premises, the ultimate solution of the problem rests with the manufacturers.

Condition of Trade.

The effects of a backward spring following a severe winter and unusual injury from floods in several sections of the country are seen in a demand for commodities in the various leading lines which is somewhat less than normal at this time. While there is a good volume of business in the aggregate, the market is without the snap and life which are looked for when climatic conditions are more favorable and trade assumes its wonted course. In the important matter of prices the market remains very steady, and many lines are held on so

reasonable a basis that any large reduction in prices is not to be anticipated. This does not apply to goods which are kept up by pools or other artificial agreement among the manufacturers, which are apt to become irregular in the presence of a seriously diminished demand or under the development of the new competition which sooner or later appears. It is gratifying to note that in several branches of the trade prices are decidedly firm and recent advances well maintained. Most of the manufacturers are well occupied with orders, but their books as a rule are not filled far in advance. To this there are some exceptions, as in certain lines the trade are calling for goods faster than the manufacturers can supply them. Export trade continues to be of gratifying and growing volume, justifying the increased attention which is being given to the cultivation of foreign fields by aggressive and enterprising houses. Among these are not only some of the very large concerns whose great interests justify extensive efforts in this direction, but many minor houses are looking after foreign business in the various ways in which this can advantageously be done for the marketing of their special products. Many of them, pursuing this course and patiently waiting for export trade, have established relations in many parts of the world which result in a regular and very satisfactory business.

Chicago.

The Hardware situation in the West seems to be this: Dealers very generally have bought their full quota of supplies. In some cases, encouraged by the good trade of last fall, and by the fact that farmers have money, dealers have bought more than their normal stocks. The condition of weather and ground and roads has delayed the sale of these stocks to the consumer, and the result is that dealers are well stocked—in some cases almost overstocked—and the buying movement from jobbers and manufacturers is correspondingly light. Still, the retail Hardware dealer does not feel at all nervous about the situation, as all conditions point to an excellent trade as soon as real spring weather begins. The West and Northwest will be particularly slow this year, owing to the fact that heavy snowfalls and freezing weather in Michigan, Wisconsin and Minnesota are delaying building and other outdoor operations, and in the tier of States south of these the conditions are equally bad, owing to the recent floods and the soggy condition of the ground. The general tone of prices is firm. Nothing but unfavorable crops can prevent the year 1904 from being an excellent Hardware year.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—As usual, the clerk of the weather comes in for censure on the part of the farmers and the farmers' friends, the merchants, for delayed business; then, when good weather does come and the farmer betakes himself to the field, the excuse is that the buyers are busy, and, therefore, the orders must be limited. If it were not for the total results we should hardly survive the disappointments of each selling season. Business is running an even foot race with last year, there being nothing to tempt speculation or to make other engagements ahead. The columns of the newspapers and sundry statistics might make us think otherwise if we listened to their siren notes, but the genuine article is simply not in the atmosphere.

With the abundance of money, even at the very small banking towns, we opine that there would be unusual activity this year in the way of building and development of all kinds were it not for the labor agitations and strikes which succeed each other with undue rapidity. No sooner does an artisan have his demands granted in one direction than an agitator, with the distinction of coming from a distant city, appears on the scene, and persuades him that he needs something else to make him entirely happy. The so-called peaceable picket is put out on the street corner, the work is stopped and capital goes into its hole. Just at present the gentlemen who are get-

ting the largest amount of free advertising in our own city are the bricklayers, the wood workers, the printers and one branch of the iron workers. The regularity with which their names appear in the local columns, or on the first pages of our newspapers, contributes in great measure to the prolongation of the strike. No notoriety is quite so delightful to the subject as that which declares that somebody or other, hitherto unknown to fame, is going to be able to tie up the United States in short order and in a hard knot. Just as certainly as this all powerful gentleman fades from public view a little later on does the matter adjust itself, but until he ceases to be sought out by the daily reporter and exploited in headlines the possibilities of settlement are very remote. Nothing would take the edge off of the troublesome phases of social disorder as speedily as well conceived silence at times on the part of the daily press, or at least a relegation of this sort of news matter to its proper place and confinement to its proper proportions.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—The situation seems to be a guessing one in weather, commerce and politics. The traditional Yankee is given a splendid opportunity to exercise his peculiar powers. We wonder how much more the Jap will have to scratch the Russian before he discovers the Tartar, and whether he will be as successful with the latter as he has thus far been in his contest with the former, and what the effect will be on the "open door." In politics the recent New York convention has given the chance to guess what will be the outcome of David's defiance of the Tammany Goliath, and what effect Presidential politics will have on this year's trade.

We are still guessing about the weather, and wonder, from day to day, whether we have not pulled off a leaf too much from our *Iron Age* calendar. We guess that spring is here, but base our belief principally on the fact that it is April 21, and not because we are gathering wild flowers or shedding our winter garments. In consequence of this uncertainty, local business is not all that it might be, although it is hard to find any good reason for a lack of orders except the backward season.

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—It has stopped raining. The sun at last is shining. Jobbers have about cleaned up their future orders for spring goods. Collective cars of Wire Cloth, Poultry Netting, Screen Doors, &c., have gone forward for distribution. Some of our salesmen are still working on spring lines. Others are taking fall orders. In our files we find orders for Stove Boards, Coal Hods, Stove Pipe elbowing orders for Refrigerators, Freezers and Garden Tools.

Every year jobbers seem to sell seasonable goods further ahead. The progressive and up to date salesman tries to book orders ahead of all of his competitors. The retail dealer, like Barkis, seems to be "willing." And so the seasons overlap and we handle spring and winter orders at the same time. When there is absolutely no speculation in the market, why should retail dealers place their future orders so early? What reason does the persuasive salesman advance? For my part, I cannot understand why they do it. There will no doubt be plenty of goods to take care of the fall business when the fall comes. Why a retail dealer whose fall order for Stove Boards will consist of three dozen should place his order in April to be shipped in September, I cannot comprehend.

Is it best for the jobbers of the country to encourage such early selling of goods? Does it not lead to a string of evils, such as guaranteed prices, buncombe prices, cancellations, duplication of orders, long datings, and a lot of unnecessary letter writing that the profit involved does not justify? If any one jobber should instruct his salesmen not to take these trifling future orders early, when they were ready to take them they would find the business had been cleaned up. Manufacturers in some lines, notably in the case of Axes, are trying to stop this sort of thing. Other manufacturers have withheld their season's prices with this object in view. The spectacle

of a lot of jobbers scrambling over a territory for future orders is neither picturesque nor dignified—Jes so! Jes so!

Cleveland.

THE W. BINGHAM COMPANY.—Continued cold weather throughout the country has operated considerably against the trade, especially in the last two weeks, but it has probably been a good thing for the jobbers, as retailers have not pushed them as hard for spring goods they ordered, as they would have done had the weather been more propitious. However, a large amount of spring goods has gone forward and they will continue to move, especially Garden Tools. There has been a scarcity in some special lines—viz., Garden Rakes, Manure Forks, Shovels, Spades, &c., on account of the great scarcity of Handles. There does not seem to be enough good timber in the country to supply the demand at the present time, and it is going to be quite a problem in the future as to where we are going to get sufficient timber for Handles. Possibly some expert will bring out something in the steel or iron line for Handles that will obviate this trouble.

Prices are firm and steady on almost all lines of goods. We believe Screws are a good purchase at present prices. We understand there is a tendency to move up prices a little, and we think the trade had better sort up pretty liberally on this line of goods. Since the revision in price of House Trimmings, there has been a good, steady trade, and we look for a large increase in same. The manufacturers of this line of goods, in going over the list, have seen fit to equalize prices—that is, scaled down some and advanced others, and there seems to be more equality in prices than there has been for some time past.

Nails and Wire are in fair demand, considering the weather conditions, and we are all looking for a much larger sale of these goods as soon as the spring really opens up. There is a good demand for Harrow Teeth, Clevises, Whiffletree Hooks and Irons, Trace Chains, Corn Planters, and kindred goods, showing that the retailer is getting ready for the demand on this class of goods on the opening of spring. Time of year and weather conditions considered, collections are quite satisfactory.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—Conditions of trade are, on the whole, favorable. The winter has been more than usually severe, and spring is somewhat late at this writing; not, however, to such extent as to cause great fear that seeding will be delayed so long as to jeopardize the crops. Fortunately, there was more than the usual amount of fall plowing done, and if spring now comes on as it promises we shall consider the prospect at this writing as favorable. The close conditions that existed during the winter tended to reduce current business to some extent, but during the last few weeks there has been a very healthy improvement in orders, and business may now fairly be classed as satisfactory.

We can see no reason now for changing in the least the opinion which we have repeatedly publicly expressed in the last few months, that there is no cause for apprehension as to the business of 1904 or that it should be considered at the start as an off year, if fair crop conditions can be realized. With favorable weather seeding will begin in earnest in the next few days in the southern part of the Dakotas and Minnesota, and will gradually extend northward, if not hindered. The feeling among merchants is good, and their stocks are in such condition as will require frequent replenishing. We have noticed that at least the usual number of new stock orders have been going through, which is a pretty accurate indication of healthy business conditions.

We believe that generally the indications are for a fairly active trade as the year advances, and that, while it is neither necessary nor advisable for the retail trade to give speculative orders, there is no reason, in our opinion, to justify their not keeping stocks up, well assorted and prepared for the probable active wants of the spring and summer business. Collections are not quite up to normal conditions.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—At last we have a change in weather, and think we can see a silver lining to the clouds that are rolling by. This has been as trying a spring as the Pacific Northwest has passed through for years. We certainly hope that the change will last long enough for us to get some little benefit, at least in volume if not in profit. Very few buyers have anticipated their wants for any time ahead in this section, and as soon as the demand is created by more favorable conditions now prevailing we should at once feel its effect on trade. Business is, however, taken on too light a margin in this territory, but there seems to be no way to remedy the evil at this time. Collections as yet show no improvement, nor are they likely to in the near future, as producers have little or nothing to realize on.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—The volume of Hardware business in this section of country is usually lighter in April than in January, February and March, and this year is no exception to the rule, though trade seems to be fully up to the expectation of the jobbers. The heaviest part of the spring business is considered over, and most of the orders we get now are small, hurry orders for immediate use.

We are having a very late spring, and the recent frosts have done much damage to fruit and vegetables, but the wheat, we are pleased to say, is looking better than it did a month ago, though the acreage in this section is very light. The acreage of cotton in Tennessee will be greater in 1904 than it has been for many years. Collections are good, and conditions generally are quite satisfactory.

New Orleans.

A. BALDWIN & Co.—Continued activity still dominates business in this section of the country, and prospects are bright for future trade. Collections are good.

NOTES ON PRICES.

Wire Nails.—While demand is fairly active, it is not as heavy as during the past month. The mills experience some trouble in getting steel promptly. They still have a large volume of orders unfilled, but the shortage of cars is less pronounced. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots.....	\$1.90
Retailers, carload lots.....	1.95
Retailers, less than carload lots.....	2.05

New York.—Demand is irregular, intermitting with weather conditions. From nearby points trade is more active than in this city. Quotations are as follows: Single carloads, \$2.10; small lots from store, \$2.20.

Chicago, by Telegraph.—Conditions are unchanged, except that business is probably a little lighter than it has been for some weeks. Prices remain as follows: Carload lots to jobbers, \$2.10 per 100 pounds; less than carloads to jobbers, \$2.15 per 100 pounds; carloads to retailers, \$2.15 per 100 pounds; less than carloads to retailers, \$2.25 per 100 pounds, all f.o.b. Chicago.

Pittsburgh.—There is nothing of special interest to note in the Wire Nail trade. Demand is fairly active, but is not as heavy as in March. The car supply is better, but there is still trouble in getting steel promptly. The mills still have a very heavy business on their books, and it will be several months at least before they have caught up with back orders. Prices continue firm and we quote Wire Nails at \$1.90 in carloads to jobbers, \$1.95 in carloads to retailers and \$2 to \$2.05 in small lots to retailers, all f.o.b. Pittsburgh, 60 days, or 2 per cent off for cash in 10 days, plus actual rate of freight to point of delivery.

Cut Nails.—The demand is moderate, so that mills are generally able to fill orders promptly. Quotations are as follows for Steel and Iron Nails, in all quarters: \$1.75, base, carloads, and \$1.80 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point

of destination; terms 60 days, less 2 per cent. off in 10 days.

New York.—Conditions remain unchanged. Demand is only fair, particularly at this point. Quotations are as follows: Carloads on dock, \$1.89½; less than carloads on dock, \$1.97½; small lots from store, \$2.05.

Chicago, by Telegraph.—The demand continues to be fairly active, with mills vigorously competing for business at the association prices, which are as follows: Carload lots, both Iron and Steel Nails, Chicago, to jobbers, \$1.91½, base; less than carloads, \$1.96½. Retailers and large consumers pay 10 cents per 100 pounds above jobbers' prices. Jobbers sell at from \$2.10 to \$2.30, base; f.o.b. Chicago warehouse, according to customer, size of order, &c.

Pittsburgh.—There is a moderate demand for Cut Nails, but it shows a falling off as compared with March business. The mills are filling orders promptly and are fairly well fixed with business. Prices are firm, and we quote: Steel and Iron Cut Nails at \$1.75, base, in carload lots, and \$1.80 in less than carloads, f.o.b. mill, terms 60 days, less 2 per cent. off in 10 days.

Barb Wire.—Back orders are now being filled by mills, which they are enabled to do owing to the less active demand. The recent floods in the West will necessitate a large amount of Fencing to take the place of that destroyed. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$2.20	\$2.50
Retailers, carload lots.....	2.25	2.55
Retailers, less than carload lots.....	2.35	2.65

Chicago, by Telegraph.—The subsidence of floods has led to somewhat of a renewal of demand, which offsets the lull of the last two or three weeks. Prices are unchanged, as follows: Carload lots, Painted Wire, \$2.40; Galvanized, \$2.70; to retailers, carload lots, Painted, \$2.45; Galvanized, \$2.75; to retailers, less than carload lots, Painted, \$2.55; Galvanized, \$2.85; Staples to jobbers, \$2.25 for Plain and \$2.65 for Galvanized, with 5 cents advance to retailers.

Pittsburgh.—Owing to falling off in demand for Barb Wire the mills are making good progress in catching up with back orders. The heavy floods in the West will require a large amount of Fencing to replace that destroyed. Prices are unchanged, but are firm. Quotations are as follows, f.o.b. Pittsburgh; terms, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carloads.....	\$2.20	\$2.50
Retailers, carloads.....	2.25	2.55
Less than carloads.....	2.35	2.65

Smooth Fence Wire.—The lighter requirements will afford the mills an opportunity to fill back orders. Quotations are as follows, f.o.b. Pittsburgh; terms, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.80
Retailers, carloads.....	1.85
Less than carloads.....	1.95

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....Base.	\$0.05	.10	.15	.25	.35	.45	.55		
Galvanized....\$0.30	.35	.40	.45	.55	.65	1.05	1.15		

Chicago, by Telegraph.—The tension of the demand has relaxed a little, but this relaxation is rather welcome than otherwise to the mills. Prices remain as follows: Smooth Fence Wire, sizes 6 to 9, \$2 per 100 pounds in carload lots to jobbers, f.o.b. Chicago; \$2.05 per 100 pounds to retailers in carload lots and \$2.10 in less than car lots.

Pittsburgh.—Demand this month for Smooth Fence Wire has not been as heavy as in March, but this will give the mills a chance to catch up with back orders. It will require several months yet before all the orders on the books of the mills have been filled. We quote as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days: Plain Wire, \$1.80, base, for

Nos. 6 to 9, in carloads to jobbers, and \$1.95 to \$2 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14.

Chicago Prices on Nuts, Bolts, &c.—Leading dealers in Nuts, Bolts, Screws and kindred lines in Chicago have agreed upon a minimum of prices from store, among which are the following: Hot Pressed Square Nuts, Blank or Tapped, \$6 off list; Hot Pressed Hexagon, \$6.50; Cold Pressed Nuts, Square, Blank and Tapper, \$5.10; Cold Pressed Blank Hexagon, \$5.60; Common Carriage Bolts, 70, 10 and 10; Machine Bolts, all sizes, 75 and 10; Set Screws, Forged, 60, 10 and 10; Case Hardened, 70 and 5; Cap Screws, Hexagon or Square Heads, 70; Structural Rivets, \$2.30, base, per 100 pounds, net; Boiler Rivets, \$2.50, base, net.

Binder Twine.—On April 15 the International Harvester Company announced prices of Binder Twine as follows:

	Cents per lb.
Sisal	10¾
Standard	10¾
Standard Manila (550 feet).....	11¼
Manila (600 feet).....	12¼
Pure Manila (650 feet).....	13¼

Five-ton lots, ¼ cent less; carload lots, ¼ cent less. Kansas City, Minneapolis, Omaha, Council Bluffs, ¼ cent higher. Pacific Coast points, 1 cent higher. Some Eastern manufacturers are quoting on the basis of 10 cents for Sisal and Standard, f.o.b. Eastern mill, ¼ cent less in carload lots. Other manufacturers who have been quoting from 9¼ to 10 cents for Sisal and Standard in small lots have made no change in prices. A comparison of the Western schedule with that announced March 30, 1903, shows that there has been a reduction of ¼ cent on Sisal and Standard, and an advance of ¼ cent on 600-foot pure Manila. Last year it was understood that the opening prices would be maintained by the International Harvester Company. No intimation accompanied this year's announcement of prices whether these prices would be continued or not.

Stove Boards.—Below we give the new list of Stove Boards as revised by the various manufacturers for 1904. The list is subject to a discount of from 30 and 10 to 40 per cent.

Stove Boards.—Per Dozen.											
Paper lined.						Wood lined.					
Alum.			Alum.			Alum.			Alum.		
Em-	num	Enam-	Em-	num	Enam-	Em-	num	Enam-	Em-	num	Enam-
bossed.	finish.	elec.	bossed.	finish.	elec.	bossed.	finish.	elec.	bossed.	finish.	elec.
24.....	\$5.40	\$6.00	24.....	\$6.00	\$7.20	24.....	\$5.40	\$6.00	24.....	\$6.00	\$7.20
26.....	6.00	6.72	26.....	6.72	8.40	26.....	6.00	6.72	26.....	6.72	8.40
27.....			27.....			27.....			27.....		
28.....	6.72	7.56	28.....	7.56	9.60	28.....	6.72	7.56	28.....	7.56	9.60
30.....	7.56	8.64	30.....	8.64	10.80	30.....	7.56	8.64	30.....	8.64	10.80
32.....	8.64	9.84	32.....	9.84	12.00	32.....	8.64	9.84	32.....	9.84	12.00
33.....			33.....			33.....			33.....		
34.....	9.72	11.40	34.....	11.40	13.20	34.....	9.72	11.40	34.....	11.40	13.20
36.....	10.80	13.20	36.....	13.20	14.40	36.....	10.80	13.20	36.....	13.20	14.40
Square.											
24 x 24.....	5.40	6.00	24 x 24.....	6.00	7.80	24 x 24.....	5.40	6.00	24 x 24.....	6.00	7.80
26 x 26.....	6.00	6.72	26 x 26.....	6.72	9.00	26 x 26.....	6.00	6.72	26 x 26.....	6.72	9.00
28 x 28.....	6.72	7.56	28 x 28.....	7.56	10.20	28 x 28.....	6.72	7.56	28 x 28.....	7.56	10.20
30 x 30.....	7.56	8.64	30 x 30.....	8.64	11.40	30 x 30.....	7.56	8.64	30 x 30.....	8.64	11.40
32 x 32.....	8.64	9.84	32 x 32.....	9.84	12.60	32 x 32.....	8.64	9.84	32 x 32.....	9.84	12.60
33 x 33.....			33 x 33.....			33 x 33.....			33 x 33.....		
34 x 34.....	9.72	11.40	34 x 34.....	11.40	13.80	34 x 34.....	9.72	11.40	34 x 34.....	11.40	13.80
36 x 36.....	10.80	13.20	36 x 36.....	13.20	15.00	36 x 36.....	10.80	13.20	36 x 36.....	13.20	15.00
Oblong.											
24 x 36.....	7.80	8.40	24 x 36.....	8.40	10.80	24 x 36.....	7.80	8.40	24 x 36.....	8.40	10.80
26 x 30.....	7.80	8.40	26 x 30.....	8.40	10.20	26 x 30.....	7.80	8.40	26 x 30.....	8.40	10.20
26 x 32.....			26 x 32.....			26 x 32.....			26 x 32.....		
28 x 32.....	8.40	9.60	28 x 32.....	9.60	11.40	28 x 32.....	8.40	9.60	28 x 32.....	9.60	11.40
28 x 34.....		9.60	28 x 34.....	9.60		28 x 34.....		9.60	28 x 34.....	9.60	
30 x 36.....	9.60	11.40	30 x 36.....	11.40	13.20	30 x 36.....	9.60	11.40	30 x 36.....	11.40	13.20
30 x 38.....			30 x 38.....			30 x 38.....			30 x 38.....		
32 x 42.....	12.00	13.80	32 x 42.....	13.80	15.60	32 x 42.....	12.00	13.80	32 x 42.....	13.80	15.60

Cordage.—Manufacturers report a fair demand for Rope, but not as large as is expected later in the season. More manufacturers appear to be making other than pure grades of Manila, owing to demand and competition. It is claimed that it is the lower grades that are being offered at less than regular prices. Quotations on the basis of 7-16 inch diameter and larger are as follows: Pure Manila, 12 cents per pound, with a rebate of ¼ to ½ cent per pound to largest buyers; other grades of Manila, 10 to 11 cents, according to quality; pure Sisal, 9¼ cents, with ¼ cent

rebate to largest buyers; Mixed Sisal, 8 cents per pound, with no rebate.

Bolts and Nuts.—At a meeting held April 20 the manufacturers of Bolts and Nuts made the following advances in prices. These are the lowest published prices, and are subject to the usual extras:

Common Carriage Bolts, $\frac{3}{8}$ x 6 and smaller and shorter, rolled thread.....	75%
Common Carriage Bolts, $\frac{3}{8}$ x 6 and smaller and shorter, cut thread.....	70 and 12 $\frac{1}{2}$ %
Common Carriage Bolts, longer and larger than $\frac{3}{8}$ x 6, cut or rolled thread.....	70 and 5%
Machine Bolts, H. P. or C. P. Nuts, $\frac{3}{8}$ x 4, smaller or shorter.....	75 and 5%
Machine Bolts, H. P. or C. P. Nuts, larger than $\frac{3}{8}$ x 4.....	75%
Machine Bolts, with C. and T. Nuts.....	70 and 5%
Machine Bolts, without Nuts.....	75 and 10%
Machine Bolt Blanks.....	75%
Bolt Ends, with H. P. or C. P. Nuts.....	75%
Bolt Ends, with C. and T. Nuts.....	70 and 5%
Plow Bolts.....	65 and 10%
Hot Pressed Square Nuts.....	\$5.80 off list.
Hot Pressed Hexagon Nuts.....	\$6.30 off list.

The above prices represent an advance of about 5 per cent. on Bolts and two-tenths on Hot Pressed Nuts. No change was made in Cold Punched Nuts, or in Coach, Lag or Skein Screws. The manufacturers express themselves as well satisfied with the situation. Prices have been well maintained and the market is very firm, and orders have recently been coming in more freely.

Spirits Turpentine.—Demand is light and confined to immediate requirements at this point. Receipts in the South are reported as increasing, with fair demand. Prices are quoted without change, but the market shows some weakness in this city, owing to an absence of active demand. Quotations, according to quantity, in this city are as follows: Oil barrels, 58 to 58 $\frac{1}{2}$ cents; machine made barrels, 58 $\frac{1}{2}$ to 59 cents.

DEATH OF WILLIAM BINGHAM.

WILLIAM BINGHAM, one of the oldest, best known and most prominent Hardwaremen of the country, died at his home in Cleveland, Ohio, on Sunday morning, April 17. He had been ailing for several months and the end had been anticipated for a week. The cause of his death was weakness of the heart, superinduced by a ripe old age.

Mr. Bingham was born in Andover, Conn., March 9, 1816. He was a descendant of the early settlers of Connecticut, his ancestors having come to this country in 1660 and founded the towns of Saybrook and Norwich. The farm on which he was born was an old estate of the Bingham family, and had been occupied by his father for many years. He remained in Andover until he was 20 years of age, when he went to Cleveland, then in its infancy. He traveled over the Albany & Schenectady Railroad, the first steam line in successful operation in the United States, as far as Schenectady, N. Y. Thence he went by canal and coach to Buffalo, taking boat at that point for Cleveland.

Upon his arrival he entered the employ of George Worthington, and remained there for two years. A little later, in 1841, he purchased the business of Clark & Murphy, and founded the firm of William Bingham & Co. He continued in charge of the business until 1888, when the name was changed to the William Bingham Company, of which corporation he was elected president, but retired from active control of affairs some years later.

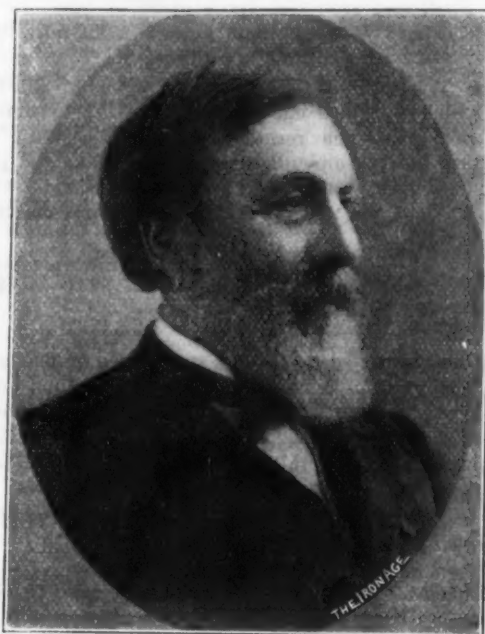
Mr. Bingham was a lifelong and sturdy Republican, but accepted few offices at the hands of his party. His first term in the public service was as member of the City Council under Mayor George Hoadley, in 1846-47. He afterward filled the position of water works trustee for seven years. During his tenure in this office the first tunnels were constructed and the present system of water works was planned. He was elected to the State Senate for one term, and was afterward selected as Presidential elector, but declined the honor, as he already held the post of Indian Commissioner. He was a member of the Board of Sinking Fund Trustees, at its inception in 1862, and held the office for some years.

His business affiliations were far reaching. He was connected with the Merchants' National Bank, the Citizens' Savings and Loan Association and the Society for Savings, and was director and vice-president of the Cincinnati, Wabash & Michigan Railway. Besides these he

was directly and indirectly interested in many other enterprises as shareholder and director.

He was equally prominent in civic life. He was the first president of the Union Club, and for years was a trustee of the First Presbyterian Church and a citizen member of the Loyal Legion. He was married in 1843 to Elizabeth Beardsley, daughter of David Beardsley, a pioneer settler of Cleveland. Mr. Bingham is survived by one son, Charles Bingham, and two daughters.

Mr. Bingham was held in high estimation by the trade on account of his personal character and worth, as well as his conspicuous business ability. George H. Sargent, speaking reminiscently of him, said he had known him for 50 years, and recalls that many years ago, although Mr. Bingham and George Worthington of Cleveland were business rivals in the same territory, they used to come to New York together to buy goods. Aside from diligent business ways, he remembers him as an upright, God-



WILLIAM BINGHAM.

fearing man, universally respected, and a fine example of manhood in the community, especially for young men. He has always had a great admiration for him, and believes every true man was his friend.

This indicates the estimation in which Mr. Bingham was held. His was an honorable and useful career, crowned with a large measure of success, and came to its close at a ripe old age amid the honor of all who knew him.

THE MARLIN FIRE ARMS COMPANY.

THE MARLIN FIRE ARMS COMPANY, New Haven, Conn., has purchased the entire business of the American Cartridge & Ammunition Company of Hartford, and has already removed the machinery to the Marlin plant at New Haven. This will enable the Marlin Company to manufacture the ammunition for their own Fire-arms. The American Cartridge & Ammunition Company went into business in 1901. They had a paid-in capital of \$60,000. Their factory was equipped with patented machinery which the Marlin Company have now acquired. The Marlin Company is capitalized at \$200,000.

THE St. Louis exhibit of F. E. Myers & Bro., Ashland, Ohio, will be located on Block 3, extreme south end of the Agricultural Building, where they expect to make an extensive and attractive display of Myers' Domestic, Wind Mill, Power, Spray and Tank Pumps, Myers' Hay Carriers, Tracks, Forks, Pulleys, Myers' Flexible Stayon Door Hangers of various styles, Store Ladders, &c.

Letters from the Trade on Catalogue House Question.

IT is now definitely determined that the catalogue house question will be a prominent subject for the consideration of the conventions which meet next month in Atlanta. S. Norvell of the Norvell-Shapleigh Hardware Company, whose letter bringing up the subject was printed in our issue, 7th inst., has been invited by the SOUTHERN HARDWARE JOBBERS' ASSOCIATION to present the subject before them. It is intended, too, that the matter shall be brought by the jobbers officially to the attention of the AMERICAN HARDWARE MANUFACTURERS' ASSOCIATION, whose convention will be in session at the same time and in the same city. In this way the subject will be brought up for thorough consideration by both the manufacturers and jobbers. It is expected, too, that the representatives of the NATIONAL RETAIL HARDWARE DEALERS' ASSOCIATION will be present to discuss the question from their standpoint. Meanwhile the interest in the subject on the part of the various classes of the trade is evidenced by the communications which are printed below:

THE CATALOGUE HOUSE PROBLEM.

SPRINGFIELD, OHIO, April 15, 1904.

To the Editor: In their communication of April 7 Norvell-Shapleigh Hardware Company request that articles on the subject be signed by the author, which request this writer is glad to comply with. There is no one subject, at this time, quite so near to the heart, the home, the pocket-book and to every direct interest of the manufacturer, jobber and retailer of goods, particularly of

A Burning Question

Hardware, as this one. I could wish that my pen might be pointed with reason and rhyme broad enough and strong enough to bring into mass convention every interested maker, distributor and retailer of goods—to the end that some plan might be devised in the brains of the many whereby this menace to all our interests might be put aside, done away with or beaten in open battle.

It is not for any of us to proclaim that the man who is able to buy and pay for goods cannot do business; what one of us would not raise the flag of fight at such a declaration? But it is for us, as business men, to learn in open warfare how to do it as successfully as the catalogue house is doing it. It must come to an open contest—such a contest, only in a larger way, as you would wage with a competing merchant across the way, where you secure agencies for special lines of goods, or are allowed territory whereon he may not put foot to sell his lines, or where, by reason of quantity or shrewd buying, you are able to undersell him—let him go where he will.

An Open Contest

The trouble is, and has been, as is suggested in this article, that we have made no noise in the fight that has been waged. There has been no real evidence of a fight having been waged at any particular time or place. In our committees, consultations and conventions we

Committing a Mistake

have used "silence is golden" in the wrong interpretation entirely, believing that a war of words would do what it may now take many years of a war of deeds to undo. By mentioning the catalogue house in whispers and as infrequently as possible, we have led each other to believe that in our particular section we were not sufferers, and in our quiet sympathy with the one supposed to be the sufferer the catalogue house has gone on, doing business nearly 365 days in the year, evidencing its growth and prosperity in every move it makes, reaching from the humble cellar or the modest 8 x 10 room to the palatial skyscraper, under whose successful wings and guidance sit 1,000,000 farmers waiting to be told they may have the monster catalogue for the asking, and its contents for the paying therefor, and the farmer goes on and pays his cash therefor, while he gives his note at six

Catalogue House Success

months, saves interest, saves security, with the privilege of renewal, for the small account he has been compelled to purchase of his home merchant through the year. We have not wanted to see that which now stands before us as a stone wall—that these men are sharp, shrewd, long headed business men, building on quickly raised foundations, but building everlastingly to stay, unless means and methods not now in evidence be brought forward to stay the hand that never rests.

Unfortunately we are compelled to admire their wonderful growth, their success on every hand, their ability to underbuy and to undersell the average retailer, and, indeed, the average jobber. No man can stand idly by and say, "They cannot succeed." They are of the same class as the man in jail (who could not be put there)—they are succeeding; they have been successful, and they bid fair to keep on succeeding.

They teach us a lesson we may never forget. They teach us that it is not necessary to keep books: that every dollar's worth of goods brings the cash; that for the cash they buy for less than their competitors; that they can do business for

Lessons to be Learned

half the expense of the average merchant; that advertising pays richly when bought as goods are bought for the shelves—that the slogan on which they build is "more goods for less money than any other house," and always "the cash both ways." So long as they are able to make the farmer and the townsman believe that this is what is to be had through them, just so long will prosperity ride side by side with the monster catalogue to be had for the asking.

As to a remedy, or any remedy for this comparatively new and vicious state of trade, it would seem to exist only in strong, concerted, never ending action; first, by the jobber, who is the keenest sufferer,

The Remedy

backed by the combination of jobber and retailer, whose interests are identical, and supported throughout by the makers of all classes of reputable goods. The minute the "catalogue" is thrown at the retailer he is impressed with the fact that to buy his goods right, to compete, he must go to the manufacturer. He does not always and immediately make the attempt to get on the ground floor and thus eliminate his friend the jobber, of whom he buys only such quantities as his needs call for,

Going to the Manufacturer

realizing that stocks must be reduced and prepared for; that he must be a much larger purchaser of goods to do this; in fact, he must overbuy, and keep on overbuying, to reach certain quantities, but the feeling is always with him that this is the only solution. It is not. He must go to his jobber and say to him, "I cannot buy these goods of you if your manufacturer continues to sell the catalogue house." A concerted continuance of this, well defined and well understood, would eventually bring results.

Just here, and while it is in mind, the Norvell-Shapleigh correspondent rather insists that this matter has not been made a sufficient part of retail Hardware association doings. We confess the results do not show as they should, while we believe there has not been a State meeting during the year in which the subject has not played a part, and yet for lack of concerted action among all of the 18, and of affiliation with their jobbers in the matter, and the fear of being outspoken, treating it as an evil, giving it constant and unwavering attention through secretaries and other officials, little seems to have been accomplished.

Yet this much we know in our own Ohio Association. We have been able to bring to these meetings two of the best known Saw makers in the world, who have declared over their own signatures and by word of mouth that they do not now and will not

Restricting Sales

at any time or under any circumstances sell their product or permit it to be sold to the catalogue house. At the same time came to us two of the representatives of the largest File makers in the country with the same statement. Also one large manufacturer of Guns and Sporting Goods. In addition to this, our secretary has on file quite a

number of letters from makers of other lines, assuring us not only of their sympathy, but of the fact that they also had decided so to deal with the trade.

Now, then, we believe if these few streams, the many of which go to make up the mighty ocean of trade, can be turned aside by the retailers (the indirect sufferers by comparison) of one State, then by concerted, never ceasing action of all jobbers and retailers, the time must come when we can fearlessly say to these men, "We positively *will not* put your line of goods on our shelves if you continue to sell catalogue houses. We cannot buy them of your jobbers, and would not if we could, and we will not buy them of you." It's as fair a proposition as ever one man put to another.

As your St. Louis correspondent suggests, "No business stands still, and the practice of the manufacturer selling to the catalogue house will increase;" It is increasing every day, but I take it the largest growth at this time belongs to a class of goods whose sale is not regularly provided for otherwise, or whose disposition has not been successfully reached through the legitimate jobber. There are, of course, standard lines of goods where no distinction is made as to the method of disposal, and the growth of all will be up or down—but has been upward so far. It ought not to be a hard proposition to submit to a maker

More Profit and Satisfaction that in the long run the jobber will distribute his goods with more profit to himself and to the maker than in any other possible way, and when he has done it there is some character in the sale, the goods have made a reputation; there is some one back of them to continue the sale of the same lines of goods, with character, profit, pleasure and satisfaction to all.

While the interests of jobber and retailer are in many ways identical, the Norvell-Shapleigh correspondent strikes a keynote as to the final remedy, if it is to come, when he says, "All of us must admit that the jobber is under some obligation to his retail customer." It would be better had he said, "under every obligation," for to the retailer alone must be look for the sale of nearly every dollar of goods that goes off his shelves. Where

Jobbers Can Do Much else would he go—to whom would he look for his distribution, unless "from jobber to consumer" and start a catalogue house of his own? If this be true—and it is—then we must largely look first to the great body of jobbers, with their territory, their influence, their regiment of salesmen, for our deliverance. There is not a retailer in existence who will not give them the necessary support—individually and through their State and National associations.

No matter what he may say at times, every retailer prefers to go to his jobber for the bulk of his goods—he can buy in such quantities as suit his stock, he can ask many favors not to be had of makers, he knows his jobber as he does his banker, and can go to him in much the same way, and in any matter of importance that affects the general trade, he looks to him first.

In the matter of the catalogue house, he is asking from all sections of the country that the jobber use his influence to prevent the growing evil of having staple and reputable lines of goods distributed by catalogue. If we can reach the manufacturer by going to him simply as a great body of tradesmen, then the sooner we go the better; but the writer believes it is the consensus of opinion among the general trade that the jobber should be first and foremost in aggressiveness, backed up and followed by the retailers throughout the country.

If more influence carries through associations, and if it be necessary that a jobbers' session and that a retail session from each State should be called—for *this sole purpose only*—then the writer believes that in the calling of the same but very few houses, either retail or wholesale, would not be represented, so great is the hold this crying evil is taking on the business men of the country. Neither time nor expense should count for anything if results are to be had, and

the time is at hand when we may ask these fair concessions from manufacturers of Hardware, the committees resulting from these sessions never resting until the members can place on their buyer's desk a list of signed agreements from these same makers of goods that they will not under any conditions sell their product or, in so far as they can prevent it, permit it to be sold to any so-called catalogue house.

H. C. WISEMAN,
Of the Springfield Hardware Company.

PLAIN FACTS PLAINLY TOLD.

CHICOPEE FALLS, MASS., April 18, 1904.

To the Editor: In *The Iron Age* of April 14 "A Merchant in Iowa" comments on prices printed by a catalogue house on our Rifles, which does us great injustice, and we hasten to correct the wrong impression the article conveys.

We furnish a printed list of prices of our entire line to all catalogue houses, below which they are not permitted to quote. The catalogue house in question decided to cut some of our staple numbers 10 cents each, and we refused to supply them any goods of our make at *any price*, and notified all the trade to refuse their orders or suffer a similar penalty. This catalogue house made further reduction, quoting absurd prices, less than the jobber was under contract to charge; but we blocked all avenues of supply so effectually and the low quotations they made created such a demand upon them that they found it necessary to issue a form letter stating that owing to the high prices we demanded they print, which they refused to do, we would not supply them with our goods, and they were temporarily out of the Stevens Rifle ordered and they were sending under separate cover their Sporting Goods catalogue and requested the customer to order something else instead. Several decoy letters brought the same results, and when the Stevens was insisted upon or refund made, the checks were returned, and the president of the catalogue house stated to the writer that we blocked them more effectually than any manufacturer they ever opposed, and we might add that we had more difficulty in keeping the jobbers from supplying our goods to this catalogue house than all others; that we had one man all the time and sometimes two watching incoming freight, and as soon as any goods were received we were at once advised, and as soon as they opened an avenue of supply we immediately closed it. This meant an enormous expense to us, as well as constant watchfulness on all sides.

Conditions have long since changed and our line today is not quoted by any catalogue house in the United States, except at prices which the retail dealer can profitably meet and draw his supplies from the jobber and show a better percentage of profit than any other Firearms quoted, and some lines of other makes are now quoted at less than the retailer can buy them.

This "Merchant in Iowa" states "the price the catalogue house makes now on these goods does not leave the retailer enough to pay for handling them." He certainly must belong to the "Old School" as far as profits go, similar to a town in which the writer sold Hardware some 15 years ago; he was offering and selling the common Steel Clamp Skates at 23 cents per pair. The merchants of this town agreed on a selling price of 75 cents per pair, the catalogue house and department stores quoted 39 or 40 cents, and do you blame the farmer boy for sending away for Skates? In the same town the writer offered the dealers a new Spring Hinge at \$9 per gross, and it was a good one, too, but they all said they did not care for them, as they could just as well sell Spring Hinges at 25 cents per pair and wanted nothing cheaper. These they paid \$12 per gross pair for, and so on through the line; and do you wonder that the catalogue houses had a magnificent business in Hardware from that town? A neighboring town, 20 miles distant, had a live, up to date Hardware dealer, who sold goods at reasonable—not cut—prices, had no trouble with the catalogue houses, sold the Hardware and Sporting Goods to his people, made a satisfactory average profit, has built a fine, modern brick block, his store is the comment of the surrounding towns, and he

does not worry about catalogue competition; but the dealers of the first mentioned town have all gone out of business, except one, and there were four. This was in a flourishing farming section west of the Mississippi, and can furnish names of towns and dealers. The same condition exists here: a short time ago the writer wanted a Steel Range with high closet, water front, no reservoir. The local dealers asked \$58 for such a Stove of standard make, and he ordered it through one of his Western Hardware friends, and paid \$35 for the same Stove delivered. A little later he wanted a Laundry Stove reset, and the local Hardwareman charged, among other things, 25 cents for a common 6-inch Damper (worth 60 cents per dozen) and 35 cents for a common 6-inch Elbow (worth 50 cents per dozen), besides 60 cents per hour for the workman. Later, we tried to buy a small article, and commented on the high price asked; the Hardwareman chuckled with glee, and said they had a county organization, and this was the agreed price.

What will build up catalogue houses and department stores faster than this?

Furthermore, in the average Western town, if the Hardware dealer wants a Carriage and does not handle Agricultural Implements, he orders it direct from some wholesale house that has no agency in his town. He does not think of buying his Clock of the local jeweler, unless he can "swap accounts" and "trade it out." He sends away for his shoes, an out of town tailor makes his clothes, and, if his wife wants a new cloak, she does not order of the local store, but "goes to the city" for it.

After the Hardware dealer sets the example, can you blame the farmer for doing the same? "Oh, consistency, thou art a jewel!"

A WORD TO THE JOBBERS.

When a manufacturer refuses to supply his goods to a catalogue house his greatest difficulty is to keep the jobber from supplying the same goods in a roundabout way. January 1, this year, we temporarily cut off a large catalogue house, but did not request the jobbers to not supply them, and the catalogue house had no difficulty in getting all of our goods that they wanted from the jobbers (at regular prices), and some of the jobbers were members of the National Hardware Jobbers' Association.

A small catalogue house can start in any large city in the United States and the jobbers will supply them with goods, electrotypes, &c. (except of their own special brands) until the new catalogue house grows large enough to buy in quantities and command factory consideration; then these same jobbers, who cultivated their trade when small, shout from the housetops that they do not sell catalogue houses—"sour grapes."

We know positively that it is a practice of jobbers in and out of the National Hardware Jobbers' Association, both large and small, when overbought on a line, to quote the large catalogue houses and department stores a special low price to assist them in "unloading."

This company has spent more energy, time and money in establishing restricted prices for the jobber and for the catalogue house than any other manufacturer, and, as stated before, prices on our goods, as printed in catalogues sent to consumers, can be met by the retailer at a better profit to himself than any other well known, popular line of goods sold in his store; and, after giving the jobber and retailer the protection and co-operation that we have, we feel we are justly entitled to his favors and support, and that criticism, as from the "Merchant in Iowa," is unjust, and that the jobber and retailer should first do a little "missionary work" among their fellow workers and purify their own household before "throwing rocks" at the manufacturers who are giving them better support and co-operation than their own people.

We trust that if discussion is continued on this subject that all will be as open as was the Norvell-Shapleigh Hardware Company in their most excellent article of April 7, and affix their signature, for it is most difficult to deal with an unknown quantity; and, if any one is ashamed to express his opinion publicly on the catalogue house question, they had best discuss it verbally.

J. STEVENS ARMS & TOOL COMPANY.

THE JOBBERS' ASSOCIATION.

FORT SMITH, ARK., April 15, 1904.

To the Editor: Your April 7 number contains an article from the Norvell-Shapleigh Hardware Company of St. Louis that must be very interesting reading to the Hardware trade. It is the first gun fired from the hill-tops; which, translated, means that at last one of the leaders and exclusives has been heard from anent the catalogue house. The above was inspired by the thought that if they, and others in their class, had condescended years ago to seek the co-operation of lesser lights, or if they would do so now, the old adage, "In union there is strength," might have been or would be verified. Opportunities have been offered them, doubtless, to associate themselves with one or both of the prominent associations of Hardware jobbers of the United States, but for reasons not difficult to surmise they have held aloof. Is it their purpose to seek and secure the aid of one or both of these organizations, or the members thereof, while holding aloof, or do they hope to rally to their standard the retailers of this country and ignore the organizations aforesaid?

We have read in the trade papers of the proceedings of the National Jobbers' Association. We have read of the numerous meetings of retail Hardware dealers. Immediately following all these meetings we have before us the catalogue (referring to some issue of some catalogue house), in which the line of goods shown is more varied and extensive than ever before, and in which the prices, we believe, are more radical. The jobbers' and retailers' associations up to this time, judging from this catalogue, have not made any deep impression upon the minds of a number of manufacturers whose names and goods appear so prominently in this catalogue.

Saith Norvell-Shapleigh Hardware Company in their letter. This is true, but not the least difficult to account for. The manufacturer knows that the four or five leading Hardware houses are not members of any association, and apparently not interested in anything the association or associations may decide to do. They figure that in the event of a "show down" they have these mammoth concerns, the department or catalogue houses, and the prominent retailers to fall back on; hence they are in a position to assume an arbitrary stand and refuse to grant the request that they withdraw their goods from catalogue houses. We heard years ago that you cannot "hold with the hare and run with the hounds" and avoid a catastrophe. Why cannot the Norvell-Shapleigh Hardware Company become members of both associations? Why is it necessary to suggest a getting together on this one question only, and how can they do so and at the same time refuse their presence and support to the only organizations of Hardware jobbers in this country? They are already organized. The Southern Hardware Jobbers' Association meets in Atlanta May 24 to 27, inclusive. We are not very familiar with the laws regarding membership, but will venture to say that a suspension of the rules can be had, if necessary, and the Norvell-Shapleigh Hardware Company elected to membership by a unanimous vote. Once there they might learn many things, and with their experience and information be of vast benefit to all concerned. If, as they say, the jobbers and retailers should get together on this one question, then are there not other questions the jobbers should get together on, and are the Norvell-Shapleigh Hardware Company willing to lend the force of their weight to these other questions? Surely they do not pretend to say that this is as far as they care to go. If to go this far is good, why not go further?

To refuse to go on leaves the other association jobbers in the predicament a negro found himself, when, dividing the result of the day's hunt with the white man, who said, "Pompey, you take the buzzard and I'll take the turkey, or I'll take the turkey and you take the buzzard." Pompey scratched his wooly head a minute and replied, "Boss, I see's whar it's up to dis nigger to take de buzzard." Yours truly,

WEBBER-AYERS HARDWARE COMPANY.

Nathan Kenyon, Ionia, Mich., has disposed of his general Hardware business to Toan & Ireland.

raw stock, but from parts previously manufactured in our own shop. The column headed "Stock No.," Fig. 12, contains the lot numbers under which the parts were originally manufactured, and by referring to the Cost Record Book the ascertained cost per hundredweight of Direct Labor, Materials and General Expense are found. These three costs, in turn, are used as rates for the corresponding part in the derivative lot. After all the extensions have been made, the columns containing Direct Labor, Materials and General Expense are footed, and brought forward to the front of the report, shown in Fig. 11. There the Direct Labor and General Expense from the back of the report are added, respectively, to the Direct Labor and General Expense of assembling. The three totals of Direct Labor, Materials and General Expense are then divided by the number of dozen finished, in order to obtain the cost per dozen, as shown in the summary.

The information obtained by separating the cost into its elements of Direct Labor, Materials and General Ex-

BROWN & SHARPE MFG. COMPANY'S CHICAGO STORE.

THE BROWN & SHARPE MFG. COMPANY, Providence, R. I., are now established in their new Chicago store, at 14-16 South Clinton street. Much care was taken in planning the arrangement of the store that the machinery and small Tools manufactured by the company might be shown to the best advantage, and that every convenience might be had for the most economical handling of the heavier goods. This has resulted in a model establishment. The company occupy the first floor and basement of a two-story building, using the lower floor for storage purposes. The store has a frontage of 27 feet and extends back 150 feet to an alley between South Clinton and South Canal streets, their old store on South Canal street being directly in the rear of the new one. The foundations and walls of the buildings are sufficiently strong to sustain six stories whenever the business requires the added space. The floor plan, Fig. 2, gives a



Fig. 1.—Interior of Brown & Sharpe Mfg. Company's Chicago Store.

pense amply repays the additional clerical work required to compute it in that form. In the first place, errors are more readily detected and traced to their source. Secondly, the effect on the cost of changes in the price of labor or materials can be more easily estimated. For example, an advance of 10 per cent. in wages would presumably result in an increase of .0337 per dozen in the cost of $\frac{3}{4}$ -inch Steel Dog Collars. (See Fig. 11.) Similarly, the effect of an advance or decline in the cost of any one of the constituent materials can be accurately estimated by referring to the base lots. (See Fig. 12.) A still further advantage of this method is the light it throws on the problem of cost reduction. Suppose the case of an article which is found to cost more than its selling price. An examination of the cost reports will perhaps show at once that an expensive labor operation on one of the parts is the cause of the loss, and the best ingenuity available is immediately set at work to find a remedy.

(To be continued.)

THE product of the Perfect Sliding Door Company, Bridgeport, Conn., is handled in California by Baker & Hamilton, San Francisco, as distributors for the northern part of the State, and by the New Sliding Door Company, 315 Braly Building, Los Angeles, as distributors for the southern portion.

general idea of the store, with the arrangement of the counters, drawers, cases, machinery platforms, overhead trolley for handling machines, elevator, &c., with the dimensions. The private office occupies space that will be used for an elevator well when new stories are built. Ample light for the middle of the store is obtained from the light shaft which is over all of the office and extends out over the store sufficiently to permit of sashes of prismatic glass being placed at an angle to throw natural light into the store, doing away with dark places.

One of the 24-foot counters is made in three sections, each containing three tiers of nine drawers each, or 81 drawers in all, used for storing small Tools. The detailed drawings, Figs. 3, 4 and 5, afford an idea of the ingenious method improvised for locking or unlocking simultaneously the 81 drawers mentioned above when closing the store at night. The drawers are supported upon steel strips, A, these strips having steel rolls upon studs, as shown at B. Grooves in the sides of the drawers have steel strips, S, which ride upon the rolls, insuring smooth action even when heavily loaded. The 81 drawers are all fastened against opening by a Yale Key at C. The general locking arrangement is this: Beside each tier of drawers is a vertical rod, D, supported in bearings fastened to the wood uprights, F (Fig. 4), beneath the strips A. These bearings also have pivoted upon them latches, G, which, by the pressure of a spring, are thrown into the groove on the side of the drawer and

hook against the front end of the steel strip in the groove, so that the drawer remains locked if so desired. By turning the thumb piece H (Figs. 3 and 5) to a horizontal position the steel strip J, which has notches in the top edge connecting with the lever K, is moved to the right and through the levers turn the vertical rods D, which operate by the pins Z in the levers against the latches G, holding them all away from the drawers, so that any or all may be opened at will. To fasten, the thumb piece H is turned into a perpendicular position, as shown, and the thumb piece L turned to a horizontal position, which turns the rod M, Fig. 3, and throws a stop piece, N, into position at the ends of the bar J, Fig. 3, thus preventing their movement by thumb pieces H. The thumb piece L is locked by the key in Yale Lock C, so that the rod M cannot be moved. The cupboard doors under the other counter are fastened in a similar manner.

The upper cases at the back of the counters are used for the display of Cutters. There are 12 of these cases in two tiers, their combined height being 12 feet 7 inches and are protected with sliding glass doors. The Cutters are placed upon pins fastened at the back board of the cases. There are about 1500 of the pins and upon the end of each is a white celluloid label upon which is printed the number or size of Cutter. The lower cases close with swinging doors, and have shelves running upon ball bearing sheaves, there being upright pins upon which the cutters are placed. The upper cases are reached by sliding ladders.

The walls of the store are handsomely embellished by pictures showing machinery manufactured by the Brown & Sharpe Company. On the wall opposite the cases are large frames containing the small Tools they manufacture. These are mounted upon dark purple velvet, which makes an attractive background. Their experience has been that black velvet tarnishes the tools, while the purple does not.

DEATH OF RUSSELL SARGENT.

RUSSELL SARGENT of Sargent & Co. of New Haven, Conn., and son of Joseph B. Sargent, died Saturday, the 16th inst., at Boston, after a short sickness of cerebro spinal meningitis. Mr. Sargent and Mrs. Sargent were visiting the latter's parents at their Boston home when Mr. Sargent became suddenly very ill on the 10th inst. He seemed to rally at first, but the hope which seeming improvement brought with it proved futile.

Russell Sargent was born in New Haven August 31, 1864. He graduated at the Sheffield Scientific School in 1884, and had been his class secretary since graduation. Shortly after completing his college course he began his connection with Sargent & Co., and for a number of years previous to his death was the head of the firm's Lock department. He was married to Margaret Berrien Motte April 19, 1894. Besides his widow, he leaves two children, a boy of nine and a daughter of four years. He was a member of the Graduates' Club, New Haven Country Club and New Haven Lawn Club. Mr. Sargent's death came as a great shock to many friends, of whom he numbered more than it is the good fortune of most men to possess. A funeral service was held at Boston Sunday in Arlington Street Church, where ten years before, almost to a day, his wedding ceremony was performed. Services were held at the residence at New Haven Monday afternoon, when an opportunity was given the men of the Lock department to look for a last time on the face of the man under whom they had worked.

The sympathy which has been extended Joseph B. Sargent and others of the family is the greater because of the sad coincidence of the death of the eldest daughter of the family, Mrs. Elizabeth Sargent Fenn, which occurred at her home in New Haven Monday morning, the day that her brother was laid away in his final rest.

Feeney & Wright Hardware Company, Fayetteville, Tenn., have been incorporated with a capital stock of \$10,000 to carry on the Hardware, Implement, Machinery and Wagon and Buggy business.

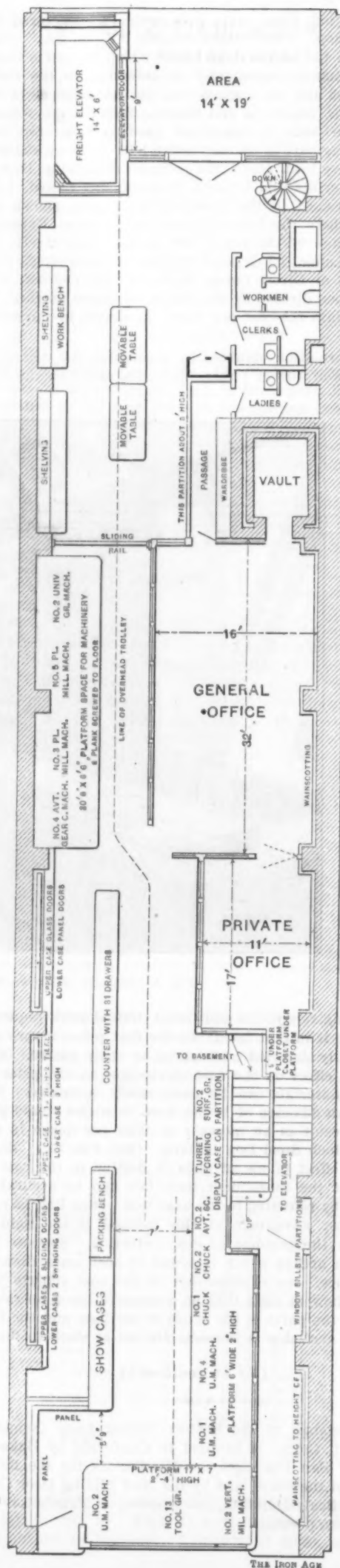


Fig. 2.—Plan of Brown & Sharpe Mfg. Company's Chicago Store.

WESTERN MASSACHUSETTS HARDWARE ASSOCIATION.

THE WESTERN MASSACHUSETTS HARDWARE ASSOCIATION has become a potent factor in the trade of Springfield and Holyoke and other places in their vicinity in the good feeling that has been engendered among the members who include all the prominent

TRADE ITEMS.

CHARLES L. WAY AND GEORGE M. BROWN of Hartford, Conn., have formed a partnership, and will represent in the New England States the automobile product of the following concerns: Haynes-Apperson Company, Kokomo, Ind., two models; Apperson Bros. Automobile Company, Kokomo, Ind., three models; Union Automobile Company,

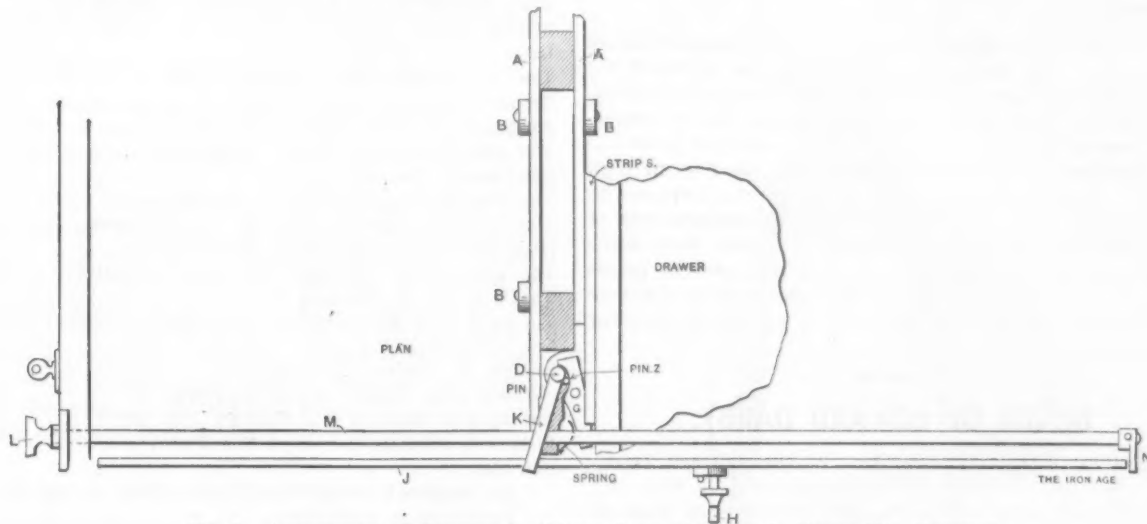


Fig. 3.—Arrangement of Drawers in Chicago Store of Brown & Sharpe Mfg. Company.

Hardware concerns of the territory included. Each city and town has its field of trade to itself, without fear of competition from neighbors of nearby places. Six meetings are held annually, each with its accompanying banquet, the annual meeting in July always being at the hotel on the summit of Mt. Tom. The territory com-

prises Springfield, Holyoke, Westfield, Chicopee, Chicopee Falls, East Hampton and Northampton. There are 23 concerns represented in the membership, and the average attendance at the meetings of the past few years has been 20. The officers of the association are: President, H. L. Russell of J. Russell & Co., Holyoke; vice-president, C. N. Bacon of B. L. Bragg Company, Springfield; secretary and treasurer, F. E. Stacy of E. S. Stacy Machine Company,

Union City, Ind., three models. The new firm have opened an office in the Park Square Automobile Station, at 43 Columbus avenue, Boston, Mass., right in the heart of the automobile district. Mr. Way was formerly identified with the Way Hardware Company of Hartford, and has taken an active and influential part in the Hardware association movement in Connecticut. The new firm will have the best wishes of many friends in their new departure.

WM. H. HART, president of the Stanley Works, New Britain, Conn., has just returned from a nine weeks' pleasure and business trip through old Mexico. Mr. Hart visited all the leading cities of the republic south of us and came to the conclusion that there were large possibilities for the extension of the sale of American goods in Mexico, provided no arbitrary obstructions were presented to the development of trade in this direction.

THE NEW YORK LOCK COMPANY, Branford, Conn., manufacturers of Builders' Hardware, &c., are sending to the Hardware trade a neat hanging sign, made of heavy bristol board, with silver lettering on a black background, showing a cut of their Ball Bearing Cylinder Lock. The sign is 14 x 16 inches, and makes an attractive advertisement of this Lock. The company will send one of the signs, upon application, to any Hardware dealer.

THE EASTERN GRANITE ROOFING COMPANY, New York, issue a booklet in which they call attention to their Perfected Granite Roofing, illustrating some of the uses for which it is intended and the advantages which it possesses. Their Western branch, 305 Frisco street, St. Louis, Mo., is prominently referred to.

THE SHATTUCK-GEORGE IRON COMPANY, jobbers of Iron, Steel and Heavy Hardware, Wichita, Kan., who were established at Wichita about the first of the year, have found business so heavy that in addition to the present three-story structure which they occupy they will build a warehouse, 25 x 60 feet. Besides selling goods in Indian Territory and Kansas, their salesmen are covering parts of Colorado and New Mexico.

THE C. E. BONNER MFG. COMPANY, Chrisman, Ill., have been incorporated with a capital stock of \$30,000, to manufacture Wrenches and Hardware. The incorporators are C. E. Bonner, George W. Fair and D. B. Tucker. The company have completed the erection of buildings and have all machinery installed.

WARNER & HAVILAND, 17 Warren street, New York, have recently been appointed Eastern agents for the VII-

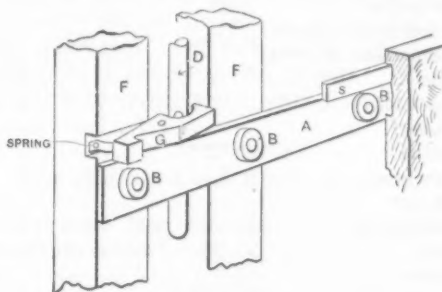


Fig. 4.

prises Springfield, Holyoke, Westfield, Chicopee, Chicopee Falls, East Hampton and Northampton. There are 23 concerns represented in the membership, and the average attendance at the meetings of the past few years has been 20. The officers of the association are: President, H. L. Russell of J. Russell & Co., Holyoke; vice-president, C. N. Bacon of B. L. Bragg Company, Springfield; secretary and treasurer, F. E. Stacy of E. S. Stacy Machine Company,

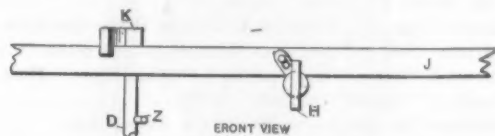


Fig. 5.

Springfield. Board of Directors, the above officers and A. J. Osborne of the G. Russell Company, Holyoke; James R. Gladwin, Westfield; F. D. Foot of Homer Foot & Co., Springfield, and J. Douglas Law, Springfield.

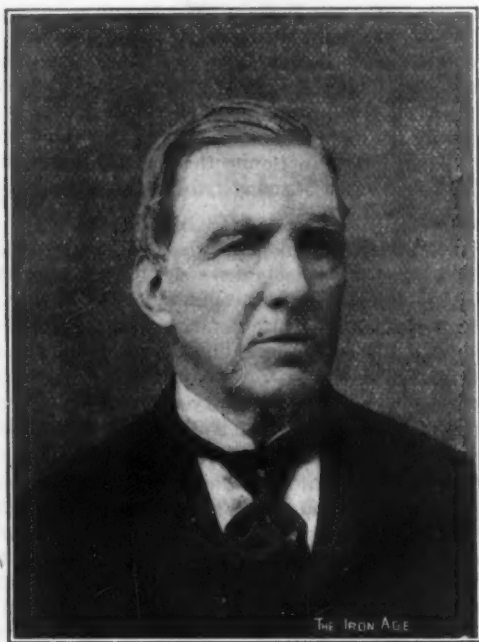
THE LEWIS TOOL COMPANY, manufacturers of Iron and Wood Workers' Vises, Anvils, &c., whose headquarters in this city have for some years been located at 44 Barclay street, have removed their New York office to the factory, in Bridgeport, Conn., where all communications will receive prompt attention.

lage Blacksmith line of hand made Butchers' Cutlery made by the Washington Cutlery Company, Milwaukee, Wis. This concern make a full line of Butchers' Knives, such as steak, sticking, skinning and boning Knives, together with bread and paring Knives, Slicers and an assortment of hand made Grass Hooks and Putty Knives. These goods are forged out by hand from high grade material and finely tempered. Warner & Haviland will carry in stock a complete line of these goods for immediate delivery.

A LARGELY attended meeting of stove manufacturers was held at the Auditorium Hotel, Chicago, April 12, for the purpose of discussing matters pertaining to the interests of the stove trade. The question of cost of production was given much attention. The matter of labor has been settled for the coming year upon the present high basis. Serious consideration was given the increases in costs which have obtained in nearly all departments of the manufacture and marketing of stoves, and while there was an unanimous expression that present prices are not remunerative, it was thought best to act conservatively and make no advance in prices, at least for the present.

DEATH OF EDWARD DARBY.

EDWARD DARBY, president of the Edward Darby & Sons Company, Philadelphia, died in that city a week ago, aged 81 years. Mr. Darby was born in Birmingham, England, May 1, 1823, and came to Phila-



EDWARD DARBY.

delphia in 1846 and engaged in the manufacture of Wire and Iron Goods and continued in business until 1902, when he became president of the Edward Darby & Sons Company, covering a period of 58 years in the same location. At the time of his death he was the oldest Wire worker in the United States. He was a member of Montgomery Lodge, No. 19, F. A. M.; Apollo Lodge 296, I. O. O. F.; Society of the Sons of St. George, Albion Society, Masters' Builders' Exchange, Trades League, Philadelphia Hardware Association, Municipal League and the Philadelphia Museum.

In many respects the subject of this sketch was a remarkable man. A more lovable or a happier disposition would be hard to find, while in all his relations—domestic, social and business—he was recognized as a model man. He retained his faculties to the last, and at a dinner of the Hardware Association held three years ago, by special request, sang two ballads (English and Scotch), with a clearness and firmness of tone which for one 78 years of age was regarded as remarkable.

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MISCELLANEOUS NOTES.

New Chicago Junior Freezer.

About two years ago the Horizontal Freezer Company, Chicago, brought out the New Chicago freezer, which we understand has given a good deal of satisfaction and has met with a large sale. This season they are introducing a lighter machine in the same general style, which they have named the New Chicago, Junior. It costs less, and is intended for lighter factory work than the larger machine.

Dixon's Motor Chain Compound.

The Joseph Dixon Crucible Company, Jersey City, N. J., have just put out Dixon's motor chain compound for properly lubricating driving chains on automobiles. It consists of a mixture of Dixon's special lubricating graphite, No. 635, with neutral animal and mineral lubricants, molded into hard oblong cakes, weighing about 3 pounds, each of which is separately wrapped. In use a chain is thoroughly cleaned in naphtha or benzine, and when dry placed in a pan in which enough of the compound is melted to cover the chain at not less than 180 degrees F., which is necessary to insure sufficient fluidity to reach all the pivots and other interior friction surfaces. This treatment provides a bushing of the graphite compound, hard and durable about every pivot and joint.

Octagon Pattern Machinists' Hammers.

The Billings & Spencer Company, Hartford, Conn., have begun the manufacture of a new octagon pattern drop forged machinists' hammer, which will supplement the line of highly finished machinists' hammers which they have manufactured for some years, the purpose being to make the new line considerably cheaper than the old. The faces, sides and peins are polished, but the rest of the head is left as it comes from the hammer. They are fitted with thoroughly seasoned hickory handles, and are made with ball, straight and cross peins. All are stamped with the trademark of the company and are fully warranted. The ball pein pattern is listed in 11 sizes, from 4 ounces to 2½ pounds. In cross and straight peins there are seven sizes, from 8 ounces to 2 pounds.

The Bishop Cold Blast Lantern.

The Hurwood Mfg. Company of Bridgeport, Conn., have begun the manufacture of the new line of lanterns



Fig. 1.—The Bishop Cold Blast Lantern.

shown in the accompanying illustrations. In both the hot air and the cold blast types the movement of the wire lever at the base lifts the chimney from the burner and also swings it out at right angles as in Fig. 2, so that it is well out of the way while the lamp is being filled and

trimmed. The wire lever operates a skeleton sleeve on one side of the frame, the form of the wire causing it to perform the double function of lifting and swinging the sleeve to which the chimney holder is fastened. In the cold blast lantern it is also necessary to lift the tin chimney against which rests the top of the glass chimney before the latter can be lifted and swung. This is accomplished by means of a plate resting free at the bottom of the skeleton sleeve, the plate being connected to the tin chimney. The lever action first raises the plate, and with it the tin chimney a distance of ¾ inch, which gives suffi-

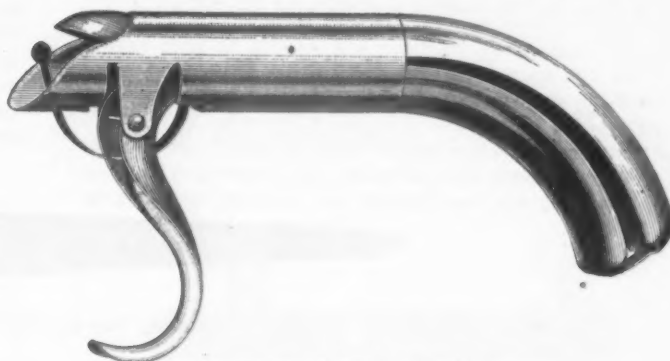


Fig. 2.—Action of Lever on Chimney.

cient clearance for the action of the lever in lifting and swinging the glass chimney. The globe may be easily removed to clean and replaced with as little effort. There is an attachment for keeping the ball in a vertical position, unless turned down, making it easy for the user when necessary or convenient to set the lantern on the ground. An important improvement provides a clear, white flame. The lantern is also referred to as round and jar proof.

Patterson's Pineapple Eye Clip.

The pineapple eye clip shown herewith is made entirely of steel, nickel plated. In use the pineapple is pared and the band of the clip pushed in under an eye about ½ inch, when the trigger is pulled. The trigger is released quickly, throwing out the bite. If the clip becomes sticky and does not work freely it may be washed

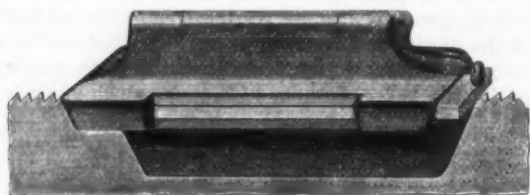


Patterson's Pineapple Eye Clip.

in hot water to clean it. The clip is referred to as being easy on the hand, requiring less time and less strength, as well as wasting less fruit than when taking the eyes out in the usual manner. The clip is designed to retail at 25 cents, and a colored easel card for show case advertising is packed with each dozen clips. They are put on the market by Patterson & Co., Rochester, N. Y.

Disston Saw Jointer.

Henry Disston & Sons, Philadelphia, Pa., are offering the saw jointer shown herewith. It is designed to dress down irregular saw teeth until they are all of an equal height, before attempting to reset and sharpen a saw. The



Disston Saw Jointer.

jointer is to facilitate this work and to insure an even edge. The device is simple in construction and readily adjusted, and is adapted to hand saws, narrow band saws, &c.

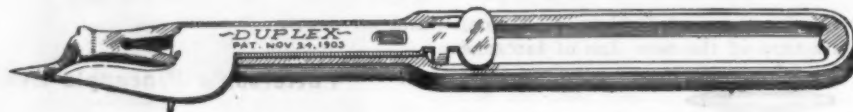
Ottumwa Ball Bearing Sash Pulley.

Johnston & Sharp Mfg. Company, Ottumwa, Iowa, have improved the construction of their ball bearing sash pulley, a phantom illustration of which is here shown. As



Sash Pulley with Hollow, Self Lubricating Balls.

previously made, eight 5-16 inch balls were used, but this style has been discontinued and superseded by a pulley containing 11 1/4-inch balls. The larger number of smaller



Duplex Can Opener.

balls on a longer track causes less friction and less noise, at the same time giving a longer life to balls and ball races. These balls, protected by numerous patents, are hollow, self lubricating and made of crucible steel.

Flexible Manicure File.

The Forquignon Mfg. Company, 13 East Sixteenth street, New York, manufacturers and importers of



Flexible Two-Handed Manicure File.

a large line of manicure and pedicure supplies, branded F. B. in a parallelogram, have recently put on the market the special pattern flexible manicure file, here illustrated. It is numbered 7, has a medium double velvet cut, is made of a fine grade of English crucible steel, hardened and tempered, and is 5 1/4 inches long. It is highly polished on both sides and both ends, so shaped on the larger end as to follow up the shape of the nail, and can be used either right or left handed.

Holt Improved Dover Egg Beater.

The Holt-Lyon Company, Tarrytown, N. Y., have put on the market the Holt improved Dover egg beater, here illustrated. The improvement is in the flare of the dashers, which, creating a greater vacuum in revolving, introduces, it is said, four times the volume of air at every revolution, so that eggs or cream are thoroughly whipped or beaten in one-third the usual time, while making the eggs, cream, &c., much lighter. It is the intention to secure a good profit to the trade by selling only those who maintain the minimum price at retail of 15 cents



Holt Improved Dover Egg Beater.

each for the smallest size, there being four sizes to meet varying requirements. The egg beaters are patented in England, Germany, France and Canada, as well as the United States. Nelson Lyon, who formerly manufactured the Lyon egg beater at Albany, N. Y., is secretary and treasurer of the Holt-Lyon Company.

Duplex Can Opener.

The Lawrence Hardware Works, 199 Centre street, New York, for whom Allerton-Clarke Company, 97 Cham-

bers street, New York, are selling agents, have just begun the manufacture of the Duplex can opener here illustrated. It is 7 1/2 inches long over all, the handle and point being of one piece of black enameled cast iron, with a sliding two-way steel cutter, polished and nickel plated, and all of one piece of steel. As the name implies there are two cutting edges, that at the point being similar to those long known in the trade, by which an odd or irregular shape can, such as a sardine box, can be opened by in-

serting the point of cutter and by a lifting motion remove the top. On the under side is another cutter for round cans, the point of handle being thrust into the center and the tin cut in a circle by sweeping the opener entirely around, it having an instantly determined radius of 1 to 3 inches, capable of cutting out a top anywhere between 2 and 6 inches across. This company will add to their line as the business develops various hardware specialties of kindred character.

Sampson Shoe Valve and Repair Plugs.

Louis Schwab, 134 Milford avenue, Newark, N. J., is the manufacturer of the Sampson shoe valve and Sampson brass repair plugs for pneumatic tires, here illustrated. The shoe valve, Fig. 1, actual size, has two brass plates slightly curved both ways so as to conform to the shape of tire. The Schrader threaded valve stem is screwed into the bottom shoe plate after it has been



Fig. 1.—Sampson Repair Shoe Valve.

worked through the tire sideways, which can be easily done with the hands or by using the pivoted hand tool furnished for this purpose, in either case it being easy to recover the shoe in tire if it slips from the hand in the process before connecting stem. When the stem is screwed into position the outer plate is dropped into place and a leakless joint obtained by tightening the



Fig. 2.—Pivoted Hand Tool for Shoe Plate.

hexagon nut on stem. The oval inner plate is $1\frac{1}{2} \times 1$ inch and the outside plate $1\frac{1}{2} \times \frac{7}{8}$ inch, the inner plate being recessed so that the outer plate gets a tenacious grip on the tire, all edges being rounded and smooth. A little tire cement on each inner surface adds to the value of the job. Some of the advantages claimed by the maker are that it will hold where the original valve has torn out; has a larger purchase on both sides of tire;

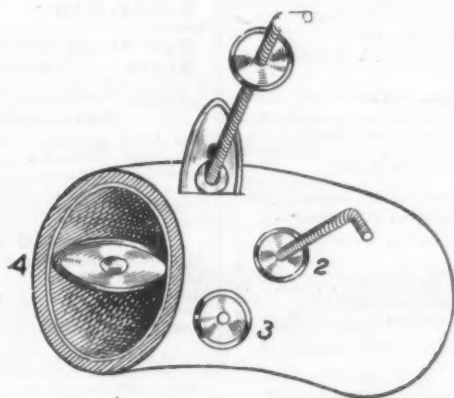


Fig. 3.—Processes in Using Brass Repair Plugs.

cannot cut; will not pull loose even if tire creeps, and will hold firmly, no matter how "squashy" or full of tire fluid a tire may be. Fig. 3 illustrates a repair plug involving similar principles of construction for the rapid repair of punctures on even the poorest and cheapest of tires, especially such as will not hold a rubber plug or

that have been "doped" with never-leak preparations. These are made in two sizes, with bottom plates $1\frac{1}{2} \times \frac{7}{8}$ and $1 \times 9-16$ inch, the round outer caps being respectively $\frac{3}{4}$ and $\frac{5}{8}$ inch diameters, both inside and outside plates conforming to shape of tire. The repair is quickly made as indicated by Fig. 3, first introducing the inside shoe, which can be worked through a very much smaller hole than the plate itself, using the threaded $1\frac{1}{2} \times 3-32$ bent brass rod, which works in a ball and socket joint, then twirling the round cap downward, the tightening being accomplished by giving the rod a few reverse turns, when the surplus rod can be cut off close to cap by a small section of hack saw blade furnished for that purpose. This plug is intended particularly for a quick repair for cheap, hard tires, the most difficult repair men and riders have to contend with, punctures on the rim side, carriage tires or tires filled with never-leak solutions. As all edges are rounded and smooth, they will not cut, especially as two edges do not meet. A quick repair vest pocket kit is sold, containing a plug of both sizes and a section of hack saw, all in a decorated hinged cover, rounded tin box $2\frac{1}{2} \times \frac{7}{8} \times \frac{5}{8}$ inch, weighing complete but $\frac{3}{4}$ ounce and always usable. A decided advantage peculiar to both articles described is that a wheel is rideable when repair is made, there being no delay for vulcanizing or waiting for cement to harden.

Erie King Barn Door Hanger and Track.

The accompanying cuts show a barn door hanger and track recently brought out by the Griffin Mfg. Company, Erie, Pa. In designing the hanger special care has been



Fig. 1.—Erie King Barn Door Hanger.

taken to make all the parts very heavy and to distribute the metal where most needed. The wheels have an improved form of groove, are carefully bored and are full roller bearing to make them anti-friction on any length of track. The frame or wheel case is made of heavy flange steel, of such shape as to protect the wheel from ice and snow and to form a very rigid support for the door. All parts except the wheel are made of wrought metal. The hangers are packed one pair in a wooden



Fig. 2.—Erie King Hanger Track.

box, complete, with bolts for putting them on the door. The track is provided with heavy double braced brackets which have a broad bearing on the building to prevent sagging and getting out of line.

Current Hardware Prices.

REVISED APRIL 20, 1904

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33 $\frac{1}{2}$ @ 33 $\frac{1}{2}$ & 10% signifies that the

price of the goods in question ranges from 33 $\frac{1}{2}$ per cent. discount to 33 $\frac{1}{2}$ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued June, 1903, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Abrasives—

Adamite in Carloads: .. \$ ton \$90@100
Crystal..... \$ ton \$120@140
See also Emery.

Adjusters, Blind—

Domestic, \$ doz. \$3.00..... 33 $\frac{1}{2}$
North's..... 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent..... 5%
Tatlin's Perfection..... 35%

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Armad Hammer, Wrought \$ doz. \$84@84 $\frac{1}{2}$
Buel Patent Trenton..... \$ doz. \$94@94 $\frac{1}{2}$
Eagle Anvils..... \$ doz. \$74@74 $\frac{1}{2}$
Ray-Budden, Wrought..... \$ doz. \$94 $\frac{1}{2}$
Horseshoe brand, Wrought..... \$ doz. \$94 $\frac{1}{2}$

Imported—

Peter Wright & Sons..... \$ doz. \$104 $\frac{1}{2}$

Anvil, Vise and Drill—

Millers Falls Co., \$18.00..... 15&10%

Apple Parers—See Parers,

Apple, &c.

Aprons, Blacksmiths'—

Hull Bros. Co..... 30&15%
Livingston Nail Co..... 38 $\frac{1}{2}$ %

Augers and Bits—

Com. Double Spur..... 75@75 $\frac{1}{2}$
Boring Machine Augers..... 65@70%
Car Bits, 12-in. twist..... 60@60 $\frac{1}{2}$
Jennings' Pattern..... 50@100@60%
Ford's Auger and Car Bits..... 40@55
Forster Pat. Auger Bits..... 25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list 25&10%
No. 30, R. Jennings' list, 40&7 $\frac{1}{2}$ &10%
Russell Jennings..... 25&10@21%
L'Hommiedieu Car Bits..... 15&10%
Mayhew's Countersink Bits..... 40%
Millers' Falls..... 50&10&7 $\frac{1}{2}$
Pugh's Black..... 20%
Pugh's Jennings' Pattern..... 35%
Snell's Auger Bits..... 60%
Snell's Bell Hangers' Bits..... 50&10%
Snell's Car Bits, 12-in. twist..... 60%
Wright's Jennings Bits (R. Jennings' list)..... 50%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's small, \$18; large, \$20..... 50&10%
Clark's Pattern, No. 1, \$ doz. \$26;
No. 2, \$18..... 50&10%
Ford's, Clark's Pattern..... 50&10@90%
C. E. Jennings & Co., Steer's Pat., 25&10%
Swan's..... 60%

Gimlet Bits—

Common Double Cut, \$3.00 @ \$3.55
German Pattern..... \$3.50 @ \$4.75

Hollow Augers—

Bonney Pattern, per doz. \$10.00 @ \$11.00
Amos..... 25&10%
New Patent..... 25&10%
Universal..... 20%
Wood's Universal..... 25%

Ship Augers and Bits—

Ford's..... 40%
Snell's..... 40%
C. E. Jennings & Co.:
L'Hommiedieu's..... 15&10%
Watrous'..... 33 $\frac{1}{2}$ &10%

Awl Hafts, See Hafts, Awl.

Awls—

Handled..... \$ doz. \$2.75 @ \$3.00
Unhandl'd, Shouldered, \$3.00 @ \$3.50
Unhandl'd, Patent..... \$ doz. \$6.00 @ \$7.00

Peg Awls—

Unhandl'd, Patent..... \$ doz. \$1.00 @ \$1.50
Unhandl'd, Shouldered, \$1.50 @ \$2.00

Scratch Awls—

Handled, Common..... \$ doz. \$3.50 @ \$4.00
Handl'd, Socket..... \$ doz. \$11.50 @ \$12.00
Hurwood..... 40%

Awl and Tool Sets—See

Sets, Awl and Tool.

Axes—

First Quality..... \$5.50 @ \$6.00

Second Quality..... \$4.75 @ \$5.25

Axle Grease—See Grease, Axle

Axles—

Concord, Loose Collar..... 50@54 $\frac{1}{2}$
Concord, Solid Collar..... 50@54 $\frac{1}{2}$
No. 1 Common..... 60@54 $\frac{1}{2}$
No. 1 $\frac{1}{2}$ Com. New Style..... 54@60 $\frac{1}{2}$
No. 2 Solid Collar..... 54@60 $\frac{1}{2}$
Nos. 7, 8, 11 and 12..... 60@60 $\frac{1}{2}$
Nos. 13 to 15..... 60@60 $\frac{1}{2}$
Nos. 15 to 18..... 60@60 $\frac{1}{2}$
Nos. 19 to 22..... 60@60 $\frac{1}{2}$

Boxes, Axle—

Common and Concord, not turned..... 15. 4 $\frac{1}{2}$ @4 $\frac{1}{2}$ $\frac{1}{2}$
Common and Concord, turned..... 15. 5@5 $\frac{1}{2}$ $\frac{1}{2}$
Half Patent..... 15. 9@9 $\frac{1}{2}$ $\frac{1}{2}$

Bait—Fishing—

Headryx:
A Bait..... 20%
B Bait..... 25%
Competitor Bait..... 20&5%

Balances—Sash—

Caldwell new list..... 50%
Pulman's..... 60%

Spring—

Spring Balances..... 60@60 $\frac{1}{2}$
Chatillon's:
Light Spz. Balances..... 40&10%
Straight Balances..... 40%
Circular Balances..... 50%
Large Dial..... 30%
Peltone..... 50%

Barb Wire—See Wire, Barb.

Bars—Crow—

Steel Crowbars, 10 to 40 lb., per lb. \$ @ 3 $\frac{1}{2}$

Towel—

No. 10 Ideal, Nickel Plate..... \$ gro. \$3.50

Beams, Scale—

Scale Beams, List Jan. 12, '95, 40&10%
Chatillon's No. 1..... 30%
Chatillon's No. 2..... 40%

Beaters—Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered \$ doz. \$8.55;
Tinned..... \$ doz. \$1.00;
No. 11 Wire Coppered \$ doz. \$1.10;
Tinned..... \$ doz. \$1.20;
No. 10 Wire Galvanized..... \$ doz. \$1.75

Western W. G. Co.

No. 1 Electric..... \$ gro. \$7.50
No. 2 Buffalo..... \$ gro. \$9.00
No. 3 Perfection..... \$ gro. \$9.00

Egg—

Holt-Lyon Co.:
Holt, No. A, Japanned..... \$ doz. \$1.20
Holt, No. 1, Tinned..... \$ doz. \$1.50
Holt, No. B, Japanned..... \$ doz. \$2.00
Holt, No. 2, Tinned..... \$ doz. \$2.25
Lyon, No. 1, Japanned..... \$ doz. \$1.25
Lyon, No. 2, Japanned..... \$ doz. \$1.50

Lighting Chain, \$ gro.

National Mfg. Co.:
No. 1 Dover, Family size..... \$7.00
No. 2 Dover, Hotel size..... \$14.00

Taplin Mfg. Co.: \$ gro.

No. 60 Improved Dover..... \$8.00
No. 75 Improved Dover..... \$6.50
No. 100 Improved Dover..... \$7.00
No. 102 Improved Dover, Tinned..... \$5.50
No. 150 Improved Dover, Hotel..... \$15.00
No. 152 Imp'd Dover, Hotel, Tinned..... \$17.00
No. 200 Imp'd Dover Tumbler..... \$8.50
No. 302 Imp'd Dover Tumbler, Tinned..... \$9.50
No. 308, Imp'd Dover Mammoth..... \$25.00

Western W. G. Co., Buffalo

Wonder (S. S. & Co.)..... \$ gro. net, \$6.00

Bellows—

Blacksmith, Standard List, 75@75 $\frac{1}{2}$ &5%

Blacksmiths'—

Inch..... 30 32 34 36 38 40
Each, \$3.50 3.75 4.25 4.80 5.35 6.15

Extra Length:

Each, \$4.00 4.55 5.10 5.60 6.10 7.50

Molders—

Inch..... 10 12 14
Doz..... \$3.50 10.00 13.00

Hand—

Inch..... 6 7 8 9 10
Doz..... \$4.25 4.50 5.00 5.50 7.75

Bells—Cow—

Ordinary goods..... 75@75 $\frac{1}{2}$ &10%
High grade..... 70@70 $\frac{1}{2}$ &10%
Jersey..... 75@10%
Texas Star..... 50%

Door—

Abbe's Gong..... 45%
Barton Gong..... 55%
Home, R. & E. Mfg. Co.'s..... 55&10%
Lever and Pull, Sargent's..... 60&10&10%
Yankee Gong..... 35%

Hand—

Hand Bells, Polished, Brass..... 60@60 $\frac{1}{2}$ &10%

White Metal..... 60%

Nickel Plated..... 30@50 $\frac{1}{2}$ &5%

Swiss..... 60@60 $\frac{1}{2}$ &7 $\frac{1}{2}$ %

Cone's Globe Hand Bells..... 33 $\frac{1}{2}$ @33 $\frac{1}{2}$ &10%

Silver Chime..... 33 $\frac{1}{2}$ @33 $\frac{1}{2}$ &10%

Miscellaneous—

Farm Bells..... \$ lb. \$ @ 3 $\frac{1}{2}$

Steel Alloy Church and School..... 60@60 $\frac{1}{2}$ &5%

American Tube & Stamp'g Co. Gongs..... 75%

Table Call Bells..... 30@30 $\frac{1}{2}$ &10%

Trip Gong Bells..... 55&10@60%

Beltling—Rubber—

Agricultural (Low Grade)..... 75@75 $\frac{1}{2}$ &5%

Common Standard..... 70@70 $\frac{1}{2}$ &10%

Standard..... 65@70%

Extra..... 60@60 $\frac{1}{2}$ &10%

High Grade..... 50@50 $\frac{1}{2}$ &10%

Boston Belting Co.:
Seamless Stitched Imperial..... 45&5%

Boston..... 50&5%

Ningara..... 60&5%

Leather—

Extra Heavy, Short Lap..... 60@60 $\frac{1}{2}$ &5%

Regular Short Lap 60@10@60 $\frac{1}{2}$ &10%

Standard..... 70@70 $\frac{1}{2}$ &5%

Light Standard..... 70@70 $\frac{1}{2}$ &10%

Cut Leather Lacing..... 60@10%

Leather Lacing Sides, per sq. ft. 18c

Bench Stops—See Stops, Bench

Benders and Upsetters,

Tire—

Detroit Perfected Tire Bender..... 40%

Green River Tire Benders and Upsetters..... 20%

Detroit Stoddard's Lightning Tire Upsetters, No. 1, \$4.25; No. 2, \$7.25; No. 3, \$10.50; No. 4, \$16.25; No. 5, \$20.50.

Bicycle Goods—

John S. Long's Son's 1903 list:

Chain..... 50%

Parts..... 50%

Spokes..... 50%

Tubes..... 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—

See Augers and Bits.

Blocks—Tackle—

Common Wooden..... 70@10@75 $\frac{1}{2}$ &5%

Hollow Steel Blocks, with Ford's Patent Sheaves..... 50&10%

Lane's Patent Automatic Lock and Junior..... 30%

Stowell's Novelty, Mal. Iron..... 50&10%

Stowell's Self Loading..... 60%

See also Machines, Hoisting.

Boards, Stove—

Zinc, Crystal, &c..... 30@10@40&10%

Bolts—

Carriage, Machine, &c.—

Common Carriage..... 70@10@75%

Phila. Eagle, \$3.00 list May 24, '95..... 80@80 $\frac{1}{2}$ &5%

Bolt Ends, list Feb. 14, '95..... 75@5%

Machine..... 75@75 $\frac{1}{2}$ &5%

Machine with C & T. Nuts..... 75@5%

Door and Shutter—

Cast Iron Barrel, Round Brass Knob:

Inch..... 3 4 5 6 8

Per doz..... \$0.25 30 39 47 .65

Cast Iron Spring Foot:

Inch..... 6 8 10

Per doz..... \$1.00 1.25 1.75

Cast Iron Chain, Flat, Japanned:

Inch..... 6 8 10

Per doz..... \$0.75 1.05 1.30

Cast Iron Shutter, Brass Knobs:

Inch..... 6 8 10

Per doz..... \$0.57 80 1.00

Wrt Barrel, Jap'd, 75@10@75&10&10%

Wrought "Bronzed, 50@50 $\frac{1}{2}$ &10%

Wrought Flush, B. K., 50@10@60&10%

Wrought Shutter..... 40&10@10@60&5%

Wrought Square Neck..... 50@50 $\frac{1}{2}$ &10%

Wrought Sunk, Flush..... 50@50 $\frac{1}{2}$ &10%

Ives' Patent Door..... 60%

Stove and Plow—

Plow..... 60&10@10@70%

Stove..... 30@5@30&10@5%

Tire—

Common..... 73 $\frac{1}{2}$ @73 $\frac{1}{2}$ &10%

Norway Iron..... 80@80 $\frac{1}{2}$ &5%

American Screw Company:

Norway Phila., list Oct. 16, '94..... 80%

Eagle Phila., list Oct. 16, '94..... 83 $\frac{1}{2}$ %

Bay State, list Dec. 28, '99..... 72 $\frac{1}{2}$ %

Franklin Moore Co.:
Norway Phila., list Oct. 16, '94..... 80%

Eagle Phila., list Oct. 16, '94..... 83 $\frac{1}{2}$ %

Eclipse, list Dec. 28, '99..... 72 $\frac{1}{2}$ %

Russell, Burdall & Ward Bolt & Nut Co.

Empire, list Dec. 28, '99..... 72 $\frac{1}{2}$ %

Norway Phila., list Oct. '94..... 80%

Upson Nut Co.:
Tire Bolts..... 72 $\frac{1}{2}$ %

Borers, Tap—

Borers Tap, Ring, with Handle:

Inch..... 1 $\frac{1}{4}$ 1

Forks—

Base Discounts Aug. 1, 1899, list:

Hay, 3 tine.....	50¢ 10¢ 5%
Boys' & Fish, 2 tine.....	50¢ 10¢ 5%
Hay & Boys', 3 tine.....	60¢ 5%
Hay & Boys', 4 tine.....	66¢ 5%
Champion Hay.....	66¢ 5%
Hay & Header, long 3 tine.....	65¢
Header, 4 tine.....	65¢
Barley, 4 & 5 tine, Steel.....	60¢ 20%
Manure, 4 tine.....	60¢ 15¢ 1%
Manure, 5 and 6 tine.....	60¢ 15¢ 1%
Spading.....	70¢ 2 1/2%
Potato Digger, 6 tine.....	60¢ 1 1/2%
Sugar Beet.....	40¢ 10%
Coke & Coal.....	40¢ 10%
H-ay Mill & Street.....	65%
Low Dig-Ezy Potato.....	65%
Victor, Hay.....	60¢ 10%
Victor, Header.....	65%
Victor, Manure.....	65%
Champion, Hay.....	60¢ 10%
Champion, Manure.....	60¢ 10%
Columbia, Hay.....	60¢ 10%
Columbia, Manure.....	65¢ 15¢ 5%
Columbia, Spading.....	70¢ 10%
Hawkeye Wood Barley 4 tine.....	50¢ 10%
W. & C. Potato Digger.....	60¢ 12 1/2%
Acme Hay.....	60¢ 10¢ 5%
Acme Manure, 4 tine.....	60¢ 10¢ 7 1/2%
Dakota Header.....	65¢ 15¢ 5%
Jackson Steel Barley.....	65¢ 15¢ 5%
Kansas Header.....	60¢ 5%
W. & C. Favorite Wood Barley 4 tine, 5 doz., \$5.00; 6 tine, \$6.00	

Plated.—See Spoons.

Fountains, Stock—

Double Dewey..... 7 doz. \$15.00

Frames—Saw—

White, Straight Bar, pr doz. 75¢ 20¢

Red, Straight Bar, per doz \$1.00 \$1.25

Red, Double Brace, per doz \$1.40 \$1.50

Freezers Ice Cream—

Qt..... 1 2 3 4 6

Each..... \$1.25 \$1.60 \$1.90 \$2.20 \$2.50

Fruit and Jelly Presses—

See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.**Fuse—**

Per 1000 Feet.

Hemp..... \$3.75

Cotton..... 3.20

Waterproof Single Taped..... 3.35

Waterproof Double Taped..... 4.40

Waterproof Triple Taped..... 5.15

Gates, Molasses and Oil—

Stebbins' Pattern..... 30¢ 50¢ 80¢ 10¢ 5%

Gauges—

Marking, Mortise, etc..... 50¢ 10¢ 50¢ 10¢ 10¢ 5%

Chapin-Stephens Co.:.....

Marking, Mortise, etc. 50¢ 10¢ 50¢ 10¢ 10¢ 5%

Scholl's Patent..... 50¢ 10¢ 50¢ 10¢ 10¢ 5%

Door Hangers..... 50¢ 10¢ 50¢ 10¢ 10¢ 5%

Fulton's Butt Gauge..... 30¢ 10¢ 50¢ 10¢ 10¢ 5%

Stanley H. & L. Co.'s B. & B. B. B. Gauge..... 30¢ 10¢ 50¢ 10¢ 10¢ 5%

Wire, Brown & Sharpe's..... 25¢

Wire, Morse's..... 25¢

Wire P. S. & W. Co..... 30¢ 10¢ 50¢ 10¢ 10¢ 5%

Climbers—Singl Cut—

Nail, Metal, Assorted, gro. \$1.40 \$1.50

Spike, Metal, Assorted, gro. \$2.80 \$3.50

Nail, Wood Handled, Assorted, gro. \$1.75 \$2.00

Spike, Wood Handled, Assorted, gro. \$1.45 \$1.50

Glass, American Window—

See Trade Report.

Glasses, Level—

Chapin-Stephens Co..... 60¢ 80¢ 10¢ 10%

Glue—Liquid Fish—

Bottles or Cans, with Brush..... 25¢ 50%

Cans (1/2 pts., pts., gal., 1/2 gal., gal.)..... 25¢ 45%

International Glue Co. (Martin's)..... 40¢ 10¢ 30%

Grease, Axle—

Common Grade..... gro. \$1.50 \$5.50

Dixon's Everlasting..... 10 lb. pack, ea. 35¢

Dixon's Everlasting, in box..... \$1.20; 2 lb. \$2.00

Grips, Nipple—

Perfect Nipple Grips..... 40¢ 10¢ 25%

Griddles, Soapstone—

Pike Mfg. Co..... 33¢ 50¢ 33¢ 10%

Grindstones—

Bicycle Emery Grinder..... \$6.50

Bicycle Grindstones, each..... \$2.50 \$3.00

Pike Mfg. Co.:.....

Improved Family Grindstones, per inch, per doz..... \$2.00

Pike Mower Knife and To..... \$3.00

Grinder, each..... \$4.00

Veloce Ball Bearing, mounted, Angle Iron Frames..... each, \$3.25

Halters and Ties—

Covert Mfg. Co.:.....

Web..... 45¢ 25%

Jute Rope..... 40¢ 50¢ 5%

Sisal Rope..... 20¢ 25%

Covert's Saddlery Works:

Web and Leather Halters..... 70%

Jute and Manila Rope Halters..... 70%

Sisal Rope Halters..... 60¢ 20%

Jute, Manila and Cotton Rope Ties..... 70%

Sisal Rope Ties..... 60¢ 10%

Hammers—

Handled Hammers—

Heller's Machinists'..... 40¢ 10¢ 40¢ 10¢ 10%

Heller's Farriers..... 40¢ 10¢ 40¢ 10¢ 10%

Magnetic Tack, Nos. 1, 2, 3, \$1.25, \$1.50, \$1.75..... 40¢ 40¢ 10¢ 10%

Picket, Stow & Wilcox..... 40¢ 10¢ 5%

Fayette H. Plumb..... 50¢ 7 1/2¢ 50¢ 10¢ 7 1/2¢

Plumb, A. E. Nail..... 30¢ 4 1/2¢ 30¢ 1 1/2¢ 7 1/2¢

Engineers' and B. S. Hand..... 50¢ 7 1/2¢ 50¢ 10¢ 7 1/2¢

Machinists' Hammers..... 50¢ 50¢ 10¢ 5%

Riveting and Tappers..... 40¢ 2 1/2¢ 40¢ 10¢ 2 1/2%

Sargent's C. S. New List..... 40%**Heavy Hammers and Sledges—**

Under 5 lb..... 10 50¢

5 to 10 lb..... 10 50¢ 80¢ 10%

Over 10 lb..... 10 50¢

Wilkinson's Smit's..... 9 50¢ 10c lb.

Handles—

Agricultural Tool Handles—

Axe, Pick, etc..... 4 50¢ 5%

Hoe, Rake, etc..... 4 50¢ 5%

Fork, Shovel, Spade, etc..... 4 50¢ 5%

Long Handles..... 4 50¢ 5%

D Handles..... 4 50¢ 5%

Cross-Cut Saw Handles—

Atkins'..... 4 50¢ 5%

Champion..... 4 50¢ 5%

Disston..... 4 50¢ 5%

Mechanics' Tool Handle—

Auger, assorted..... gro. \$2.50 \$2.85

Brad Axl..... gro. \$1.65 \$1.85

Chisel Handles:

Apple Tanged Firmer, gro. ass'd..... \$2.40 \$2.65

Hickory Tanged Firmer, gro. ass'd..... \$2.15 \$2.40

Apple Socket Firmer, gro. ass'd..... \$1.75 \$1.95

Hickory Socket Firmer, gro. ass'd..... \$1.45 \$1.60

Hickory Socket Framing, gro. ass'd..... \$1.60 \$1.75

File, assorted..... gro. \$1.30 \$1.50

Hammer, Hatchet, Axe, etc..... 50%

Hand Saw, Varnished, doz. 30¢ 35¢

Not Varnished..... 65¢ 75¢

Plane Handles:

Jack doz. 30¢; Jack Bolted..... 75¢

Fore, doz..... 45¢; Fore, Bolted..... 90¢

Chapin-Stephens Co.:.....

Carving Tool..... 40¢ 40¢ 10%

Chisel..... 65¢ 65¢ 10%

File and Axl..... 65¢ 65¢ 10%

Saw and Plane..... 40¢ 40¢ 10%

Screw Driver..... 40¢ 40¢ 10%

Millers Falls Adj. and Hatchet Auger..... 15¢ 10%

Nicholson Simplicity File Handle..... \$0.35 \$1.50

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track.

and Parlor Door Hangers per double set with track, etc.

Barn Door, New Pattern, Round Groove, Regular:

Inch..... 3 4 5 6 8

Single Doz. \$0.90 1.25 1.60 1.95 2.50

Barn Door, New England Pattern, Check Back, Regular:

Inch..... 3 4 5 6

Single Doz. \$1.30 1.85 2.50 3.00

Alfith Mfg. Co.:.....

Reliable No. 1..... per doz. \$2.00

Reliable No. 2..... per doz. \$1.50

Chicago Spring Butt Co.:.....

Friction..... 25%

Oscillating..... 25%

Big Twin..... 35%

Chisholm & Moore Mfg. Co.:.....

Baggage Car Door..... 50%

Elevator..... 30%

Railroad..... 50%

Cronk & C. Mfg. Co.:.....

1000 Axle..... 60%

Roller Bearing..... 60¢ 10%

Lane Bros. Co.:.....

Parlor, Ball Bearing..... \$4.15

Parlor, Standard..... \$3.55

Parlor, New Model..... \$2.85

Parlor, New Champion..... \$2.25

Barn Door, Standard, 50¢ 10¢ 5%

Hinged..... 60¢ 40

Covered..... 50¢ 10¢ 10%

Special..... 50¢ 10¢ 10¢ 5%

Lawrence Bros.:.....

Advance..... 90%

Cleveland..... 60¢ 10%

Crown..... 60%

Giant..... 50¢ 10%

New York..... 60%

Peerless..... 60¢ 10%

Sterling..... 60%

Swing, No. 6..... 60%

Union, No. 44, \$5.00; No. 45, \$7.00; No. 46, \$9.00.

McKinney Mfg. Co.:.....

No. 1, Special, \$15..... 60¢ 10%

No. 2, Standard, \$18..... 60¢ 10%

Hinged Hangers, \$16..... 50%

Meyers' Stagon Hangers..... 60%

C. S. Smith Mfg. Co.:.....

Lundy Parlor Door..... 50¢ 10%

Monarch Barn Door..... 50¢ 10%

Never Jump Hinge..... 50¢ 10%

Peerless..... 60¢ 10%

Precision..... 70¢ 5%

Phoenix..... 70¢ 5%

Wagner's Adjustable..... 70¢ 10%

Warehouses' Anti-Friction..... 60%

Richards Mfg. Co.:.....

Pioneer Wood Track No. 8..... \$2.25

Imp'd Wood Track No. 5..... \$2.25

Imp'd Steel Track No. 7..... \$2.70

Imp'd Steel Track No. 9..... \$2.65

Ball B'r'g Steel Track No. 9..... \$2.50

Ball B'r'g Steel Track No. 10..... \$2.50

Ball B'r'g Steel Track No. 11..... \$2.45

Ball B'r'g Steel Track No. 12..... \$2.40

Ball B'r'g Steel Track No. 13..... \$2.35

Ball B'r'g Steel Track No. 14..... \$2.35

Ball B'r'g Trolley Track No. 15..... 40%

Ball B'r'g Trolley Track No. 19..... 40%

Ball Bearing Tandem Trolley..... 40%

Track No. 16..... 40%

Silent Adjustable Track No. 18..... 40%

Auto Adjustable Track No. 22..... 40%

Trolley F. D. No. 17..... \$1.60

Trolley F. D. No. 120..... \$2.00

Trolley F. D. No. 121..... \$2.25

Trolley F. D. No. 131..... \$3.00

Roller Bearing D. D. No. 25..... 70%

Roller Bearing U. S. B. D..... 70%

Anti Friction B. D..... 60¢ 10%

Ives' Wood Track No. 1..... \$2.15

Ives' Imp'd Wood Track No. 2..... \$2.15

Safety Door Hanger Co.:.....

Storm King Saffey..... 40%

U. S. Standard Hinge..... 60%

Stowell Mfg. and Foundry Co.:.....

Acme Parlor Ball Bearing..... 40%

Ajax Hinge Door..... 50%

Apex Parlor Door..... 50¢ 10¢ 5%

Atlas..... 60%

Baggage Car Door..... 50%

Climax Anti-Friction..... 50¢ 10%

Elevator..... 40%

Express..... 50%

Freight Car Door..... 60%

Interstate..... 50¢ 10%

Lundy Parlor Door..... 50¢ 10%

Matchless..... 60%

Nansen..... 60¢ 10%

Parlor Door..... 50¢ 10%

Railroad..... 50¢ 10%

Rest Hinge Door..... 60%

Street Car Door..... 50%

Steel, Nos. 300, 404, 500..... 50¢ 10%

Underwriter's Flr. Door..... 40%

Wild West Warehouse Door..... 50%

Zenith for Wood Track..... 50¢ 10%

A. L. Sweet Iron Works:.....

Eagle..... 60¢ 10%

Hyo..... 50¢ 10%

Perfection..... 60%

Pilot..... 40%

Taylor & Boggs' F. & C. Kidder's Roller Bearing..... 50¢ 15¢ 10¢ 5%

Wilcox Mfg. Co.:.....

Bike Roller Bearing..... 60¢ 10%

C. J. Roller Bearing..... 60¢ 10%

C. J. Roller Bearing..... 60¢ 10%

Dwarf Ball Bearing..... 50%

Ives, Wood Track..... 40%

L. T. Roller Bearing..... 60¢ 10¢ 5%

New Era Roller Bearing..... 50¢ 10%

O. K. Roller Bearing..... 60¢ 10¢ 5%

Prindle, Wood Track..... 60%

Richards' Wood Track..... 50%

Richards' Steel Track..... 50%

Spencer Roller Bearing..... 60¢ 10%

Tandem Nos. 1 and 2..... 60%

Wire Goods Co:
Acme.....60&10%
Chief.....70%
Crown.....70&10%
Czar.....65%
V Brace.....50&15%
Czar Harness.....50&15%

Wrought Iron
Box, 6 in., per doz. \$1.00; 8 in. \$1.25;
10 in., \$2.00.
Cotton.....doz. \$1.05@1.25
Wrought Staples, Hooks, &c.—
See Wrought Goods.

Miscellaneous
Hooks, Bench, see Staps. Bench.
Bush, Light, doz. \$5.50; Medium,
\$6.00; Heavy, \$6.50

Grass.....Nos. 1 2 3 4
Best.....\$1.50 1.75 2.00
Common.....\$1.30 1.50 1.60
Potato and Manure.....60&15%
Wh. fletre.....lb. 5/4@6c
Hooks and Eyes:
Brass.....60&10&10%
Malleable Iron.....70&5@70&10%
Covert Saddlery Works' Self Looking
Gate and Door Hooks.....60%
Pt. Madison Cut-Easy Corn Hooks,
\$5.25 net

Bench Hooks—See Bench Staps.
Corn Hooks—See Knives, Corn.
Horse Nails—See Nails, Horse
Horsehoes—
See Shoes, Horse.

Hose Rubber
Garden Hose, 3/4-inch:
Competition.....ft. 4 5 c
3-ply Standard.....ft. 6 7 c
4-ply Standard.....ft. 7 8 c
5-ply extra.....ft. 8 9 c
6-ply extra.....ft. 10 10 1/2 c
Cotton Garden, 3/4-in., coupled:
Low Grade.....ft. 6 @ 7 c
Fair quality.....ft. 8 @ 9 c

Irons—Sad—
From 4 to 10.....lb. 3/4@3 c
B. B. Sad Irons.....lb. 3/4@3 1/2 c
Chinese Laundry.....lb. 1/4@5c
Chinese Sad.....lb. 1/4@5c
Mrs. Potts', per set:
Nos.....50 55 60 65
Jap'd Tops 71 68 81 78
Tin'd Tops 71 71 81 81
New England Pressing, lb. 3/4@4c

Pinking
Pinking Irons.....doz. 50@50c
Soldering
Soldering Coppers 2 1/2 and 3.....19@20c
1 1/2 and 2.....21@22c

Jacks Wagon
Covert Mfg. Co.:
Auto Screw.....80&5%
Steel.....45&2%
Covert's Saddlery Works':
Daisy.....60&10%
Victor.....60&10%
Lockport.....50%
Lane's Steel.....30&10%

Kettles
Brass, Spun, Plain.....\$20@25%
Enamelled and Cast Iron—See Ware,
House.

Knives
Butcher, Kitchen, &c.—
Foster Bros.' Butcher, &c.....30%
Smith & Hemenway Co.....40&10%
Wilkinson Shear & Cutlery Co.....50%
Hay and Straw—See Hay Knives.

Corn
Wilmington Acme, 7 doz., \$2.05; Dent,
\$2.75; Adl. Serrated, \$2.90; Ser-
rated, \$2.10; Yankee No. 1, \$1.50;
Yankee No. 3, \$1.15.

Drawing
Standard List.....70&5@70&10%
Bradley's.....35%
C. E. Jennings & Co. Nos. 45, 46, 60&10%
Jennings & Griffin, Nos. 51, 52, 60&10%
Swan's.....70&10&3/4%
Watrous.....10%
L. & J. J. White.....30&25%

Hay and Straw
Lightning.....7 doz. \$6.50@7.00
Iwan's Sickle Edge.....7 doz. \$10.00
Iwan's Serrated.....7 doz. \$10.00
Maine.....7 doz. \$8.50

Mining
Buffalo.....7 gro. \$13.00
Miscellaneous
Farriers'.....doz. \$5.00@5.25
Wootenholm's.....doz. \$5.00@5.25

Knobs
Base, 2 1/2-inch, Birch, or Maple,
Rubber tip, gro.....\$1.10@1.15
Carriage, Jap. all sizes, gro. 40&5c
Door, Mineral.....doz. 65@70c
Door, Por. Jap'd.....doz. 70@75c
Door, Por. Nickel.....doz. \$2.05@2.15
Bardley's Wood Door, Shutter, &c. 15%
Picture, Sargent's.....60&10&10%

Lacing Leather
See Belting Leather.
Ladders, Step, Etc.—
Labe's Store.....25%
Myers Noiseless Store Ladders.....30%

Ladies—Melting
L. & G. Mfg. Co., Low List.....25%
P. S. & W.....50%
Reading.....60%
Sargent.....45&10%

Lanterns—Tubular
Regular Tubular No. 0, doz. \$1.35@1.75
Lift Tubular, No. 0, doz. \$1.75@5.35
Hinge Tubular, No. 0, doz. \$1.75@5.35
Other Styles.....doz. 10@10&10&5%

Bull's Eye Police
No. 1, 3/4 inch.....\$2.50@2.75
No. 2, 3 inch.....\$2.75@3.00

Lasts and Stands Shoe
Stowell's Atlas, Malleable Iron.....30%
Stowell's Badger, Cast Iron.....30%

Latches
Thumb
Roggin's Latches, with screw, dz \$5@10c
Leaders Cattle
Small.....doz. 55c; large, 60c
Covert Mfg. Co.....15&2%

Lifters, Transom—
R. & E.....33&4%

Lines
Wire Clothes, Nos. 18 19 20
100 feet.....\$2.50 2.00 1.65
75 feet.....\$1.50 1.70 1.30

Solid Braided Chalk, No. 0 to 3.....40%
Silver Lake Braided Chalk, No. 0, \$6.00;
No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50
1 gr.....20%

Masons' Lines, Shade Cord, &c.: White
Cotton, No. 3, \$1.50; No. 4, \$2.00; No.
4 1/2, \$2.50; Colors, No. 3, \$1.75; No. 4,
\$2.25; No. 4 1/2, \$2.75; Lines, No. 3,
\$2.50; No. 4, \$3.00; No. 4 1/2, \$3.50
Tent and Awning Lines: No. 5, White
Cotton, \$7.50; Drab Cotton, \$8.50
Clothes Lines, White Cotton: 50 ft., \$2.75;
30 ft., \$3.25; 70 ft., \$3.75; 75 ft., \$4.00;
80 ft., \$4.25; 90 ft., \$4.75; 100 ft., \$5.25
Annular Wagon Works' Clothes, 50 ft.,
1 gr.: \$36.00; Gilt Edge, \$34.00; Air Line
\$34.00; Acme, \$19.00; Alabama, \$17.00;
Empire, \$18.00; Advance, \$15.00; Ori-
ole, \$22.00; Albermarle, \$15.00; Ecl'pse,
\$13.50; Chicago, \$12.50; Standard,
\$11.00; Columbia, \$9.50.

Looks—Cabinet
Cabinet Locks.....35/4@35/4&7/4%
Door Locks, Latches, &c.—
[Not prices are very often made on
these goods.]
Reading Hardware Co.....50%
R. & E. Mfg. Co.....40%
Sargent & Co.....40&10%
Stowell's Steel Door Latches.....50%

Elevator
Stowell's.....50%
Padlocks
Wrought Iron.....7/4@10&5@50&50%
R. & E. Mfg. Co. Wrt Steel and Brass
75&15&10%

Sash, &c.
Ives' Patent:
Bronze and Brass.....62&1%
Crescent.....50%
Iron.....62&1%
Wrought Bronze and Brass.....55%
Wrought Steel.....35%
Reading.....net 50%

Machines—Boring
Com. Upright, Without Augers.....\$2.00
Com. Angular, Without Augers.....\$2.25
Without Augers.....\$2.00
R. & E. Mfg. Co.: Upright, Angular,
Improved No. 3, \$4.25 No. 1, \$5.00
Improved No. 4, 3.75 No. 2, 3.38
Improved No. 5, 2.75
Jennings', No. 4, 3.15 No. 1, 3.50
Miller's Falls.....5.75
Snell's, Rice's Pat. 2.50 2.75

Corking
Reisinger Invinible Hand Power.....
\$ doz. \$48.00

Fence—
Williams' Fence Machines.....each, \$5.50
Holating
Moore's Anti-Friction Differential Pul-
ley Block.....30%
Moore's Hand Hoist, with Lock Brake, 30%
Ice Cutting
Chandler's.....15&10%

Washing
Boss Washing Machine Co.: Per doz.
No. 1, Rose Rotary.....\$57.00
Boss No. 7, Dietz Rotary.....\$60.00
Champion Rotary; Banner No. 1.....\$54.00
Standard Champion No. 1.....\$48.00
Standard Perfection.....\$36.00
Cint Square Western.....\$30.00
Uneda American, Round.....\$29.00

Mallets
Hicory
Lignumvitae.....4&5@50%
Timmers', Hickory and Applewood,
doz.....50@55c

Mashers, Vegetable
Western, W. G. Co., Potato.....60&10%
Mats—Door
Elastic Steel (W. G. Co.).....10%

Mattocks
See Picks and Mattocks.
Milk Cans—See Cans, Milk
Mills—Coffee, etc.—
Rutner Patent Mfg. Co.....\$5@90%
National, list Jan. 1, 1902.....30%
Parker's Columbia & Victoria, 50&10&80%
Parker's Box and Side.....50&10&80%
Sinn, No. 1080, 1 lb mill.....7 doz \$30.00
Swift, Lane Bros Co.....30%

Mowers, Lawn
List prices are generally quoted.
Cheap.....all sizes, \$1.75@2.00
Good.....all sizes, \$2.25@2.50

High Grade 4.25 4.50 4.75 6.00
Continental.....60&5%
Great American.....60&5%
Great American Ball Bearing, new list, 70%
Quaker City.....75%
Pennsylvania.....60&5%
Pennsylvania, Jr., Ball Bearing.....60%
Pennsylvania Golf.....50%
Pennsylvania Horse.....35&5%
Pennsylvania Pony.....40&5%
Philadelphia:
Styles M. S., C. K. T.....70&5%
Style A, all Steel.....60&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, low list.....40&5%

Nails
Cut and Wire. See Trade Report.
Wire Nail: See Brads, Papered.
List July 20, 1899.....85&10&10&30%
Hungarian, Finishing, Upholster-
ers', &c. See Tacks.

Horse
Nos. 7 8 9 10
A. C.....25 22 21 21 40&5%
C. B. K.....25 22 21 21 40%
Anchor.....21 20 19 18 50%
Champion.....25 23 24 23 50%
Coleman.....13 12 11 11 50%
Maud S.....25 22 21 21 50%
New Haven.....21 20 19 18 40&5%
Putnam.....23 21 20 19 35&5%
New Putnam 19 17 16 16 10&10%
Western, per lb.....8&4c
Jobbers' special brands, per lb. 8&8 1/2c

Picture
Brass Head, 1 1/2 2 3/4 3 3 1/2 in.
For. Head.....1.50 1.50 1.50 1.50 gro.

Nippers, See Pliers and Nippers.
Nuts
Cold Punched: Off list.
Mfrs. or U. S. Standard.
Square, plain.....\$5.30
Hexagon, plain.....\$5.60
Square, C. T. & R.....\$5.30
Hexagon, C. T. & R.....\$6.00
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square Blank.....\$6.00
Hexagon Blank.....\$6.50
Square Tapped.....\$6.00
Hexagon Tapped.....\$6.50

Oakum
Best or Government.....lb. 6/4c
Navy.....lb. 6/4c
U. S. Navy.....lb. 6/4c
Plumbers' Spun Oakum.....7/4c
In carload lots 1/4c lb. off f.o.b. New
York.

Oil Tanks—See Tanks, Oil.
Oilers
Brass and Copper.....60&10%
Tin or Steel.....70&10&75%
Zinc.....65&10%
Chas. or Paragon:
Brass and Copper.....45&10&50%
Tin or Steel.....75&10&10%
Zinc.....65%
Malleable, Hammers' Improved, No. 1,
\$3.50; No. 2, \$4; No. 3, \$4.40 doz. 30%
Malleable, Hammers' Old Pattern,
same list.....50&10%
American Tube & Stamping Co.:
Spring Bottom Cans.....70&70&10%
Railroad Oilers etc.....60&60&10%

Openers—Can
French.....doz. 55c
Iron Handle.....doz. 25@27c
Sprague, Iron Hdle., per doz. 35@40c
Sardine Scissors.....doz. \$1.75@3.00
Marvel.....per doz. \$1.25
National.....50%
Stowell's Sprague.....per doz. 35@45c
Tip Top.....per doz. \$0.75
Triumph Shear.....\$ gro. \$9.00

Egg
Nickel Plate.....per doz., \$2.00
Silver Plate.....per doz., \$4.00

Packing
Asbestos Packing, Wick and Rope,
1 1/2@15c lb.

Rubber
Sheet, C. I.....8@10c
Sheet, C. O. S.....9@15c
Sheet, C. B. S.....10@14c
Sheet, Pure Gum.....60@65c
Sho. c. Red.....40@45c
Jenkins' Standard, 7 1/2 8 1/2 9 1/2 10 1/2 11 1/2 12 1/2 13 1/2 14 1/2 15 1/2 16 1/2 17 1/2 18 1/2 19 1/2 20 1/2 21 1/2 22 1/2 23 1/2 24 1/2 25 1/2 26 1/2 27 1/2 28 1/2 29 1/2 30 1/2 31 1/2 32 1/2 33 1/2 34 1/2 35 1/2 36 1/2 37 1/2 38 1/2 39 1/2 40 1/2 41 1/2 42 1/2 43 1/2 44 1/2 45 1/2 46 1/2 47 1/2 48 1/2 49 1/2 50 1/2 51 1/2 52 1/2 53 1/2 54 1/2 55 1/2 56 1/2 57 1/2 58 1/2 59 1/2 60 1/2 61 1/2 62 1/2 63 1/2 64 1/2 65 1/2 66 1/2 67 1/2 68 1/2 69 1/2 70 1/2 71 1/2 72 1/2 73 1/2 74 1/2 75 1/2 76 1/2 77 1/2 78 1/2 79 1/2 80 1/2 81 1/2 82 1/2 83 1/2 84 1/2 85 1/2 86 1/2 87 1/2 88 1/2 89 1/2 90 1/2 91 1/2 92 1/2 93 1/2 94 1/2 95 1/2 96 1/2 97 1/2 98 1/2 99 1/2 100 1/2 101 1/2 102 1/2 103 1/2 104 1/2 105 1/2 106 1/2 107 1/2 108 1/2 109 1/2 110 1/2 111 1/2 112 1/2 113 1/2 114 1/2 115 1/2 116 1/2 117 1/2 118 1/2 119 1/2 120 1/2 121 1/2 122 1/2 123 1/2 124 1/2 125 1/2 126 1/2 127 1/2 128 1/2 129 1/2 130 1/2 131 1/2 132 1/2 133 1/2 134 1/2 135 1/2 136 1/2 137 1/2 138 1/2 139 1/2 140 1/2 141 1/2 142 1/2 143 1/2 144 1/2 145 1/2 146 1/2 147 1/2 148 1/2 149 1/2 150 1/2 151 1/2 152 1/2 153 1/2 154 1/2 155 1/2 156 1/2 157 1/2 158 1/2 159 1/2 160 1/2 161 1/2 162 1/2 163 1/2 164 1/2 165 1/2 166 1/2 167 1/2 168 1/2 169 1/2 170 1/2 171 1/2 172 1/2 173 1/2 174 1/2 175 1/2 176 1/2 177 1/2 178 1/2 179 1/2 180 1/2 181 1/2 182 1/2 183 1/2 184 1/2 185 1/2 186 1/2 187 1/2 188 1/2 189 1/2 190 1/2 191 1/2 192 1/2 193 1/2 194 1/2 195 1/2 196 1/2 197 1/2 198 1/2 199 1/2 200 1/2 201 1/2 202 1/2 203 1/2 204 1/2 205 1/2 206 1/2 207 1/2 208 1/2 209 1/2 210 1/2 211 1/2 212 1/2 213 1/2 214 1/2 215 1/2 216 1/2 217 1/2 218 1/2 219 1/2 220 1/2 221 1/2 222 1/2 223 1/2 224 1/2 225 1/2 226 1/2 227 1/2 228 1/2 229 1/2 230 1/2 231 1/2 232 1/2 233 1/2 234 1/2 235 1/2 236 1/2 237 1/2 238 1/2 239 1/2 240 1/2 241 1/2 242 1/2 243 1/2 244 1/2 245 1/2 246 1/2 247 1/2 248 1/2 249 1/2 250 1/2 251 1/2 252 1/2 253 1/2 254 1/2 255 1/2 256 1/2 257 1/2 258 1/2 259 1/2 260 1/2 261 1/2 262 1/2 263 1/2 264 1/2 265 1/2 266 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1/2 392 1/2 393 1/2 394 1/2 395 1/2 396 1/2 397 1/2 398 1/2 399 1/2 400 1/2 401 1/2 402 1/2 403 1/2 404 1/2 405 1/2 406 1/2 407 1/2 408 1/2 409 1/2 410 1/2 411 1/2 412 1/2 413 1/2 414 1/2 415 1/2 416 1/2 417 1/2 418 1/2 419 1/2 420 1/2 421 1/2 422 1/2 423 1/2 424 1/2 425 1/2 426 1/2 427 1/2 428 1/2 429 1/2 430 1/2 431 1/2 432 1/2 433 1/2 434 1/2 435 1/2 436 1/2 437 1/2 438 1/2 439 1/2 440 1/2 441 1/2 442 1/2 443 1/2 444 1/2 445 1/2 446 1/2 447 1/2 448 1/2 449 1/2 450 1/2 451 1/2 452 1/2 453 1/2 454 1/2 455 1/2 456 1/2 457 1/2 458 1/2 459 1/2 460 1/2 461 1/2 462 1/2 463 1/2 464 1/2 465 1/2 466 1/2 467 1/2 468 1/2 469 1/2 470 1/2 471 1/2 472 1/2 473 1/2 474 1/2 475 1/2 476 1/2 477 1/2 478 1/2 479 1/2 480 1/2 481 1/2 482 1/2 483 1/2 484 1/2 485 1/2 486 1/2 487 1/2 488 1/2 489 1/2 490 1/2 491 1/2 492 1/2 493 1/2 494 1/2 495 1/2 496 1/2 497 1/2 498 1/2 499 1/2 500 1/2 501 1/2 502 1/2 503 1/2 504 1/2 505 1/2 506 1/2 507 1/2 508 1/2 509 1/2 510 1/2 511 1/2 512 1/2 513 1/2 514 1/2 515 1/2 516 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1/2 642 1/2 643 1/2 644 1/2 645 1/2 646 1/2 647 1/2 648 1/2 649 1/2 650 1/2 651 1/2 652 1/2 653 1/2 654 1/2 655 1/2 656 1/2 657 1/2 658 1/2 659 1/2 660 1/2 661 1/2 662 1/2 663 1/2 664 1/2 665 1/2 666 1/2 667 1/2 668 1/2 669 1/2 670 1/2 671 1/2 672 1/2 673 1/2 674 1/2 675 1/2 676 1/2 677 1/2 678 1/2 679 1/2 680 1/2 681 1/2 682 1/2 683 1/2 684 1/2 685 1/2 686 1/2 687 1/2 688 1/2 689 1/2 690 1/2 691 1/2 692 1/2 693 1/2 694 1/2 695 1/2 696 1/2 697 1/2 698 1/2 699 1/2 700 1/2 701 1/2 702 1/2 703 1/2 704 1/2 705 1/2 706 1/2 707 1/2 708 1/2 709 1/2 710 1/2 711 1/2 712 1/2 713 1/2 714 1/2 715

Lion Nut Co., 00@60&10
 Box Wood, 35&10@35&10&10
 Ivory, 35&10@35&10&10
Sash Locks—See *Locks, Sash*
Sash Weights—
 See *Weights, Sash*.
Sausage Stuffers or Fillers—
 —See *Stuffers or Fillers, Sausage*.
Saw Frames—See *Frames, Saw*.
Saw Sets—See *Sets, Saw*.
Saw Tools—See *Tools, Saw*.
Saws—
 Atkins :
 Circular 50¢
 Band 50&10@60¢
 Cross Cuts 35&5¢
 Mulay, Mill and Drag 50¢
 One-Man Saw 40¢
 Wood Saw Blades 40¢
 Hand, compass, &c. 40¢
 Chapin-Stephens Co.:
 Turning Saws and Frames 30@30&10¢
 Diamond Saw & Stamping Works:
 Stering Kitchen Saws 30&10&5¢
 Diston's :
 Circular, Solid and Inserted Tooth 50¢
 Band, 3 to 14 in. wide 50¢
 Hand, 14 to 24" 70¢
 Crosscuts 45¢
 Narrow Crosscuts 50¢
 Mulay, Mill and Drag 50¢
 Framed Woodsaws 35¢
 Wood Saw Blades 35¢
 Wood Saw Rods 25¢
 Hand Saws, Nos. 19, 99, 9, 10, 1100, 25¢
 DS, 120, 79, 77, 8 25¢
 Hand Saws, Nos. 7, 107, 107½, 8, 1, 30¢
 0, 00, Combination 30¢
 Compass, Keyhole, &c. 25¢
 Butcher Saws and Blades 35¢
 C. E. Jennings & Co.'s :
 Back Saws 25&10¢
 Butcher Saws 30&10¢
 Compass and Key Hole Saws 35&5¢
 Framed Wood Saws 30&10¢
 Hand Saws 20&2½&10¢
 Wood Saw Blades 30&10¢
 Millers Fall:—
 Butcher Saws 15&10¢
 Star Saw Blades 18&10¢
 Peace & Richardson's Hand Saws 30¢
 Simon:—
 Circular Saws 50¢
 Crescent Ground Cross Cut Saws 35¢
 One-Man Cross Cuts 40&10¢
 Gang Mill, Mulay and Drag Saws 50¢
 Band Saws 50¢
 Back Saws 25¢&5¢&7½¢
 Butcher Saws 30¢&5¢&7½¢
 Hand Saws 25¢&7½¢
 Hand Saws, Bay State Brand 45¢
 Compass, Keyhole, &c. 25¢&5¢&7½¢
 Wood Saws 35¢&5¢&7½¢
 Wheeler, Madden & Clemson Mfg. Co.'s 50¢
 Cross Cut Saws 50¢
Hack Saws—
 Atkins' Hack Saw Blades A A A 25¢
 Diston:
 Concave Blades 25¢
 Keystone 40¢
 Hack Saw Frames 30¢
 Richburg File Works, The Best 30¢
 C. E. Jennings & Co.'s :
 Hack Saw Frames, Nos. 175, 180 35&5&10¢
 Hack Saws, Nos. 175, 180, complete 35&5&10¢
 Goodell's Hack Saw Blades 40¢
 Griffin's Hack Saw Frames 35&5&10¢
 Griffin's Hack Saw Blades 35&5&10¢
 Star Hack Saws and Blades 15&10¢
 Sterling Hack Saw Blades 25¢
 Sterling Hack Saw Frames 30& 0&5¢
Scroll—
 Barnes' No. 7, \$15 25¢
 Barnes' Scroll Saw Blades 40¢
 Barnes' Velocipede Power Scroll Saw, 40¢
 without boring attachment, \$18 :
 with boring attachment, \$30 30¢
 Lester, complete, \$10.00 15&10¢
 Rogers, complete, \$4.00 15&10¢
Scales, Fish—
 Bishop's Lightning ½ doz. \$3 00
 Covert's Saddlory Works 60&10¢
Scales—
 Family, Turnbull's 50@50&10¢
 Counter :
 Hatch, Platform, 4x20x14 lbs. doz. \$5.50 50¢
 Two Platforms, ½ oz to 8 lbs. doz. \$10 50¢
 Union Platform, Plain \$1.70 @ 1.90 50¢
 Union Platform, Striped \$1.85 @ 2.10 50¢
 Chaffin's :
 Eureka 35¢
 Favorite 35¢
 Grocers' Trip Scales 50¢
 Chicago Scale Co.:
 The "Little Detective," 25 lbs. 50¢
 Union or Family No. 3 60¢
 Precision Platform (reduced flat) 50¢
 Wagon or Stock, reduced flat list 35¢
 Pelouze Scales—Household, Counter 50¢
 Candy, Ice, Postal, Computing 50¢
 "The Standard" Portables 50¢
 "The Standard" R. R. and Wagon 50¢
Scrapers—
 Box, 1 Handle doz. \$2.00 @ 2.50 50¢
 Box, 2 Handle doz. \$2.60 @ 3.50 50¢
 Ship 50¢
 Light, \$3.00; Heavy, \$1.50 50¢
 Adjustable Box Scraper (S. R. & L. Co.) 50¢
 Chapin-Stephens Co., Box 30&50&10¢
Screens, Window, and
Frames—
 Flyer Pattern Screens 60&50&60&5&21¢
 Maine Screen Frames 40¢ 10&5¢
 Perfection Screens 60&50&60&5&21¢
 Phillips' Screen Frames, 60¢ 50¢ 10&5¢ 21¢
 Porter's :
 Fairview Screens 60&50&60&5&21¢
 Hummer Screens 60&50&60&5&21¢
 Klondike Screens 60&50&60&5&21¢

Screws—Bench and Hand—
Bench, Iron, doz. 1 in. \$3.50 to \$7.75
1 1/2, \$3.00 to \$5.25; 1 3/4, \$3.50 to \$5.75
Bench, Wood, Beech, doz. 30 to 30¢
Hand, Wood, doz. 30 to 30¢
R. & H. Mfg. Co., Hand, doz. 30 to 30¢
Chapin-Stephens Co., Hand, doz. 30 to 30¢
Coach, Lag and Hand Rail—
Lag, Common Point, list Oct. 1, 1899, 80¢
Coach and Lag, Gimlet Point, list Oct. 1, 1899, 80¢
Hand Rail, list Jan. 1, '81, 70¢ to 10¢
Jack Screws—
Standard List, 75¢ to 10¢ to 80¢
Millers Falls, 50¢ to 10¢
P. & S. W., 50¢ to 10¢
Sargent, 70¢

Machine—
List Jan. 1, '88, 75¢ to 10¢ to 80¢
Flat or Round Head, Iron, 50¢ to 50¢ to 10¢
Flat or Round Head, Brass, 50¢ to 50¢ to 10¢
Set and Cap—
Set (Iron or Steel) 70¢ to 10¢
Sq. Hd. Cap, 65¢ to 10¢
Hex. Hd. Cap, 65¢ to 10¢
Rd. or Fullister Hd. Cap 60¢
Wood—
List July 23, 1903, 75¢ to 10¢ to 80¢
Manufacturers' printed discounts:
Flat Head, Iron, 87¢ to 10¢
Round Head, Iron, 85¢ to 10¢
Flat Head, Brass, 85¢ to 10¢
Round Head, Brass, 80¢ to 10¢
Flat Head, Bronze, 77¢ to 10¢
Round Head, Bronze, 75¢ to 10¢
Drive Screws, 87¢ to 10¢
Scroll Saws—See Saws, Scroll.
Scythes— Per doz.
Clipper Pattern, Grass, \$4.50 to \$5.00
Full Polished Clipper, \$4.75 to \$5.50
Grain, \$7.00 to \$7.50
Clipper, Grain, \$7.75 to \$8.25
Weed and Bush, \$4.50 to \$5.00
Seeders— Rains—
Enterprise, 25¢ to 30¢
Sets— Awl and Tool—
Brad Awl and Tool Sets:
Wood Hdl., 10 sets doz. \$2.00 to \$2.25
Wood Hdl., 1/2 Awls, 6 Tools, doz. \$3.50 to \$3.60
Allen's Sets, Awl and Tools, No. 20, \$3.00 to \$10.00
Fray's Adj. Tool Hdl's, Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9; 5, \$7
C. E. Jennings & Co.'s Model Tool Holders, \$4 to 10¢
Millers Falls Adj. Tool Hdl's, No. 1, \$12; No. 4, \$12; No. 5, \$18; No. 10, \$18
Stacy's Excelsior, No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50
Garden Tool Sets—
Pl. Made on Tree Plant, a Hoe, Rake and Shovel, \$9.00
Nail—
Square, per gro. \$3.25 to \$3.50
Round, Bk. and Pol., assorted, gro. \$1.80 to \$2.00
Octagon, gro. \$1.50 to \$1.75
Hook Brothers, 27¢
Cannon's Diamond Point, \$1.35
Mayhew's, per gro. \$0.60
Snell's Corrugated, Cup Pt. per gro. \$1.50
Snell's Knurled, Cup Pt., per gro. \$1.50
Rivet—
Regular list, 70¢ to 10¢ to 75¢
Saw—
Allen's, 50¢ to 10¢
Genuine, 50¢ to 10¢
Imitation, 50¢ to 10¢
Atkin's, 40¢
Criterion, 40¢
Adjustable, 40¢
Bemis & Co.'s, 30¢
Cross Cut, 30¢
Hammer, 30¢
Plate, 30¢
Spring Hammer, 30¢
Dixson's Star and Monarch, 30¢
Morrill's No. 1, \$15.00
Nos. 3 and 4, Cross Cut, \$9.00
No. 5, Mill, \$30.00
No. 10, 11, 12, \$15.00
No. 1 Old Style, \$10.00
Special, \$16.25
Giant Royal, Cross Cut, \$8.50
Royal Hand, \$8.50
Taintor Positive, \$8.50
Shaving—
Fox Shaving Sets, No. 30, per doz. \$24.00 net
Sharpeners, Knife—
Chicago Wheel & Mfg. Co., 65¢
Shaves Spoke—
Iron, doz. \$1.00 to \$1.15
Wood, doz. \$1.75 to \$2.00
Bailey's (Stanley R. & L. Co.), 80¢ to 10¢ to 10¢
Chapin-Stephens Co., 80¢ to 10¢ to 10¢
Goodell's, \$9.00
Wood's F1 and F2, 80¢

Shears—
Cast Iron, 7 8 9 in.
Best, \$16.00 18.00 20.00 gro.
Good, \$13.00 15.00 17.00 gro.
Cheap, \$5.00 6.00 7.00 gro.
Straight Trimmers, &c.:
Best quality, Jap., 70¢ to 70¢ to 10¢
Nickel, 60¢ to 60¢ to 10¢
Fair qual. Jap., 80¢ to 80¢ to 10¢
Nickel, 75¢ to 75¢ to 10¢
Tailors' Shears, 40¢ to 40¢ to 10¢
Acme Cast Shears, 40¢ to 40¢ to 10¢
H. Inrich's Tailors' Shears, 40¢
Wilkinson's Hedge, 1900 list 40¢
Wilkinson's Branch, Lawn and Border, 40¢
Wilkinson's Sheep, 1900 list 40¢
Tinners' Snips—
Steel Blades, 40¢ to 40¢ to 10¢
Steel Laid Blades, 40¢ to 40¢ to 10¢
Forged Handles, Steel Blades, Berlin, 40¢ to 40¢ to 10¢

Heinrich's Snips, 40¢
Jennings & Griffin Mfg. Co.'s, 40¢ to 10¢
Nagars Snips, 40¢
P. & S. W. Co., 40¢
Triumph Pipe Shear, \$2.00
Pruning Shears and Tools—
Cronk's Grape Shears, 33¢
Cronk's Pruning Shears, 33¢
Dixson's Combined Pruning Hook and Saw, \$12.00
Dixson's Pruning Hook, \$12.00
John T. Henry Mfg. Co.:
Pruning Shears, all grades, 40¢ to 40¢ to 10¢
Orange Shears, 30¢ to 30¢ to 10¢
Grape, 40¢ to 40¢ to 10¢
Tree Pruners, 75¢
P. & S. W. Co., 33¢
Sheaves—Sliding Door—
Stowell's Anti-Friction, 50¢
Patent Roller Hatfield's, Sargent's list, 70¢ to 10¢
Reading, 30¢
R. & E. list, 33¢
Wrightsville Hatfield Pattern, 50¢
Sliding Shutter—
Reading list, 50¢
R. & E. list, 33¢
Sargent's list, 50¢ to 10¢
Shells— Shells, Empty—
Brass Shells, Empty:
First quality, all gauges, 40¢ to 5¢
Climax, Club, Rival, 10 and 12 gauge, 65¢ to 5¢
Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 30 gauge, 25¢ to 5¢
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 16 and 30 gauge, 20¢
Climax, Union, League, New Rival, 10 and 12 gauge, 25¢
Climax, Union, League, New Rival, 14, 16 and 30 gauge (\$7.50 list), 30¢
Expert, Metal Lined and Pigeon, 10, 12, 16 and 30 gauge, 33¢ to 5¢
Robin Hood, Low Brass, 30¢ to 10¢
Robin Hood, High Brass, 30¢ to 10¢
Shells, Loaded—
Loaded with Black Powder, 40¢
Loaded with Smokeless Powder, medium grade, 40¢ to 5¢
Loaded with Smokeless Powder, high grade, 40¢ to 10¢ to 10¢
Robin Hood Smokeless Powder:
Robin Hood, Low Brass, 30¢
Comets, High Brass, 50¢ to 10¢
Shoes Horse, Mule, &c.—
F. O. b., Pittsburg:
Steel, per keg \$3.85
Steel, per keg \$3.60
Burden's, all sizes, \$3.60
Shot—
Drop, up to B, 25-lb. bag, \$1.67
Drop, 12 and larger, per 25-lb. bag, \$1.85
Buck, 25-lb. bag, \$1.85
Chilled, 25-lb. bag, \$1.85
Shovels and Spades—
Association List, Nov. 15, 1902, 40¢
Sieves and Sifters—
Hunter's Imitation, gro. \$10.50 to \$11.00
Buffalo Metallic, 2 1/2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 16, 18, 20, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84, 90, 96, 102, 108, 114, 120, 126, 132, 138, 144, 150, 156, 162, 168, 174, 180, 186, 192, 198, 204, 210, 216, 222, 228, 234, 240, 246, 252, 258, 264, 270, 276, 282, 288, 294, 300, 306, 312, 318, 324, 330, 336, 342, 348, 354, 360, 366, 372, 378, 384, 390, 396, 402, 408, 414, 420, 426, 432, 438, 444, 450, 456, 462, 468, 474, 480, 486, 492, 498, 504, 510, 516, 522, 528, 534, 540, 546, 552, 558, 564, 570, 576, 582, 588, 594, 600, 606, 612, 618, 624, 630, 636, 642, 648, 654, 660, 666, 672, 678, 684, 690, 696, 702, 708, 714, 720, 726, 732, 738, 744, 750, 756, 762, 768, 774, 780, 786, 792, 798, 804, 810, 816, 822, 828, 834, 840, 846, 852, 858, 864, 870, 876, 882, 888, 894, 900, 906, 912, 918, 924, 930, 936, 942, 948, 954, 960, 966, 972, 978, 984, 990, 996, 1002, 1008, 1014, 1020, 1026, 1032, 1038, 1044, 1050, 1056, 1062, 1068, 1074, 1080, 1086, 1092, 1098, 1104, 1110, 1116, 1122, 1128, 1134, 1140, 1146, 1152, 1158, 1164, 1170, 1176, 1182, 1188, 1194, 1200, 1206, 1212, 1218, 1224, 1230, 1236, 1242, 1248, 1254, 1260, 1266, 1272, 1278, 1284, 1290, 1296, 1302, 1308, 1314, 1320, 1326, 1332, 1338, 1344, 1350, 1356, 1362, 1368, 1374, 1380, 1386, 1392, 1398, 1404, 1410, 1416, 1422, 1428, 1434, 1440, 1446, 1452, 1458, 1464, 1470, 1476, 1482, 1488, 1494, 1500, 1506, 1512, 1518, 1524, 1530, 1536, 1542, 1548, 1554, 1560, 1566, 1572, 1578, 1584, 1590, 1596, 1602, 1608, 1614, 1620, 1626, 1632, 1638, 1644, 1650, 1656, 1662, 1668, 1674, 1680, 1686, 1692, 1698, 1704, 1710, 1716, 1722, 1728, 1734, 1740, 1746, 1752, 1758, 1764, 1770, 1776, 1782, 1788, 1794, 1800, 1806, 1812, 1818, 1824, 1830, 1836, 1842, 1848, 1854, 1860, 1866, 1872, 1878, 1884, 1890, 1896, 1902, 1908, 1914, 1920, 1926, 1932, 1938, 1944, 1950, 1956, 1962, 1968, 1974, 1980, 1986, 1992, 1998, 2004, 2010, 2016, 2022, 2028, 2034, 2040, 2046, 2052, 2058, 2064, 2070, 2076, 2082, 2088, 2094, 2100, 2106, 2112, 2118, 2124, 2130, 2136, 2142, 2148, 2154, 2160, 2166, 2172, 2178, 2184, 2190, 2196, 2202, 2208, 2214, 2220, 2226, 2232, 2238, 2244, 2250, 2256, 2262, 2268, 2274, 2280, 2286, 2292, 2298, 2304, 2310, 2316, 2322, 2328, 2334, 2340, 2346, 2352, 2358, 2364, 2370, 2376, 2382, 2388, 2394, 2400, 2406, 2412, 2418, 2424, 2430, 2436, 2442, 2448, 2454, 2460, 2466, 2472, 2478, 2484, 2490, 2496, 2502, 2508, 2514, 2520, 2526, 2532, 2538, 2544, 2550, 2556, 2562, 2568, 2574, 2580, 2586, 2592, 2598, 2604, 2610, 2616, 2622, 2628, 2634, 2640, 2646, 2652, 2658, 2664, 2670, 2676, 2682, 2688, 2694, 2700, 2706, 2712, 2718, 2724, 2730, 2736, 2742, 2748, 2754, 2760, 2766, 2772, 2778, 2784, 2790, 2796, 2802, 2808, 2814, 2820, 2826, 2832, 2838, 2844, 2850, 2856, 2862, 2868, 2874, 2880, 2886, 2892, 2898, 2904, 2910, 2916, 2922, 2928, 2934, 2940, 2946, 2952, 2958, 2964, 2970, 2976, 2982, 2988, 2994, 3000, 3006, 3012, 3018, 3024, 3030, 3036, 3042, 3048, 3054, 3060, 3066, 3072, 3078, 3084, 3090, 3096, 3102, 3108, 3114, 3120, 3126, 3132, 3138, 3144, 3150, 3156, 3162, 3168, 3174, 3180, 3186, 3192, 3198, 3204, 3210, 3216, 3222, 3228, 3234, 3240, 3246, 3252, 3258, 3264, 3270, 3276, 3282, 3288, 3294, 3300, 3306, 3312, 3318, 3324, 3330, 3336, 3342, 3348, 3354, 3360, 3366, 3372, 3378, 3384, 3390, 3396, 3402, 3408, 3414, 3420, 3426, 3432, 3438, 3444, 3450, 3456, 3462, 3468, 3474, 3480, 3486, 3492, 3498, 3504, 3510, 3516, 3522, 3528, 3534, 3540, 3546, 3552, 3558, 3564, 3570, 3576, 3582, 3588, 3594, 3600, 3606, 3612, 3618, 3624, 3630, 3636, 3642, 3648, 3654, 3660, 3666, 3672, 3678, 3684, 3690, 3696, 3702, 3708, 3714, 3720, 3726, 3732, 3738, 3744, 3750, 3756, 3762, 3768, 3774, 3780, 3786, 3792, 3798, 3804, 3810, 3816, 3822, 3828, 3834, 3840, 3846, 3852, 3858, 3864, 3870, 3876, 3882, 3888, 3894, 3900, 3906, 3912, 3918, 3924, 3930, 3936, 3942, 3948, 3954, 3960, 3966, 3972, 3978, 3984, 3990, 3996, 4002, 4008, 4014, 4020, 4026, 4032, 4038, 4044, 4050, 4056, 4062, 4068, 4074, 4080, 4086, 4092, 4098, 4104, 4110, 4116, 4122, 4128, 4134, 4140, 4146, 4152, 4158, 4164, 4170, 4176, 4182, 4188, 4194, 4200, 4206, 4212, 4218, 4224, 4230, 4236, 4242, 4248, 4254, 4260, 4266, 4272, 4278, 4284, 4290, 4296, 4302, 4308, 4314, 4320, 4326, 4332, 4338, 4344, 4350, 4356, 4362, 4368, 4374, 4380, 4386, 4392, 4398, 4404, 4410, 4416, 4422, 4428, 4434, 4440, 4446, 4452, 4458, 4464, 4470, 4476, 4482, 4488, 4494, 4500, 4506, 4512, 4518, 4524, 4530, 4536, 4542, 4548, 4554, 4560, 4566, 4572, 4578, 4584, 4590, 4596, 4602, 4608, 4614, 4620, 4626, 4632, 4638, 4644, 4650, 4656, 4662, 4668, 4674, 4680, 4686, 4692, 4698, 4704, 4710, 4716, 4722, 4728, 4734, 4740, 4746, 4752, 4758, 4764, 4770, 4776, 4782, 4788, 4794, 4800, 4806, 4812, 4818, 4824, 4830, 4836, 4842, 4848, 4854, 4860, 4866, 4872, 4878, 4884, 4890, 4896, 4902, 4908, 4914, 4920, 4926, 4932, 4938, 4944, 4950, 4956, 4962, 4968, 4974, 4980, 4986, 4992, 4998, 5004, 5010, 5016, 5022, 5028, 5034, 5040, 5046, 5052, 5058, 5064, 5070, 5076, 5082, 5088, 5094, 5100, 5106, 5112, 5118, 5124, 5130, 5136, 5142, 5148, 5154, 5160, 5166, 5172, 5178, 5184, 5190, 5196, 5202, 5208, 5214, 5220, 5226, 5232, 5238, 5244, 5250, 5256, 5262, 5268, 5274, 5280, 5286, 5292, 5298, 5304, 5310, 5316, 5322, 5328, 5334, 5340, 5346, 5352, 5358, 5364, 5370, 5376, 5382, 5388, 5394, 5400, 5406, 5412, 5418, 5424, 5430, 5436, 5442, 5448, 5454, 5460, 5466, 5472, 5478, 5484, 5490, 5496, 5502, 5508, 5514, 5520, 5526, 5532, 5538, 5544, 5550, 5556, 5562, 5568, 5574, 5580, 5586, 5592, 5598, 5604, 5610, 5616, 5622, 5628, 5634, 5640, 5646, 5652, 5658, 5664, 5670, 5676, 5682, 5688, 5694, 5700, 5706, 5712, 5718, 5724, 5730, 5736, 5742, 5748, 5754, 5760, 5766, 5772, 5778, 5784, 5790, 5796, 5802, 5808, 5814, 5820, 5826, 5832, 5838, 5844, 5850, 5856, 5862, 5868, 5874, 5880, 5886, 5892, 5898, 5904, 5910, 5916, 5922, 5928, 5934, 5940, 5946, 5952, 5958, 5964, 5970, 5976, 5982, 5988, 5994, 6000, 6006, 6012, 6018, 6024, 6030, 6036, 6042, 6048, 6054, 6060, 6066, 6072, 6078, 6084, 6090, 6096, 6102, 6108, 6114, 6120, 6126, 6132, 6138, 6144, 6150, 6156, 6162, 6168, 6174, 6180, 6186, 6192, 6198, 6204, 6210, 6216, 6222, 6228, 6234, 6240, 6246, 6252, 6258, 6264, 6270, 6276, 6282, 6288, 6294, 6300, 6306, 6312, 6318, 6324, 6330, 6336, 6342, 6348, 6354, 6360, 6366, 6372, 6378, 6384, 6390, 6396, 6402, 6408, 6414, 6420, 6426, 6432, 6438, 6444, 6450, 6456, 6462, 6468, 6474, 6480, 6486, 6492, 6498, 6504, 6510, 6516, 6522, 6528, 6534, 6540, 6546, 6552, 6558, 6564, 6570, 6576, 6582, 6588, 6594, 6600, 6606, 6612, 6618, 6624, 6630, 6636, 6642, 6648, 6654, 6660, 6666, 6672, 6678, 6684, 6690, 6696, 6702, 6708, 6714, 6720, 6726, 6732, 6738, 6744, 6750, 6756, 6762, 6768, 6774, 6780, 6786, 6792, 6798, 6804, 6810, 6816, 6822, 6828, 6834, 6840, 6846, 6852, 6858, 6864, 6870, 6876, 6882, 6888, 6894, 6900, 6906, 6912, 6918, 6924, 6930, 6936, 6942, 6948, 6954, 6960, 6966, 6972, 6978, 6984, 6990, 6996, 7002, 7008, 7014, 7020, 7026, 7032, 7038, 7044, 7050, 7056, 7062, 7068, 7074, 7080, 7086, 7092, 7098, 7104, 7110, 7116, 7122, 7128, 7134, 7140, 7146, 7152, 7158, 7164, 7170, 7176, 7182, 7188, 7194, 7200, 7206, 7212, 7218, 7224, 7230, 7236, 7242, 7248, 7254, 7260, 7266, 7272, 7278, 7284, 7290, 7296, 7302, 7308, 7314, 7320, 7326, 7332, 7338, 7344, 7350, 7356, 7362, 7368, 7374, 7380, 7386, 7392, 7398, 7404, 7410, 7416, 7422, 7428, 7434, 7440, 7446, 7452, 7458, 7464, 7470, 7476, 7482, 7488, 7494, 7500, 7506, 7512, 7518, 7524, 7530, 7536, 7542, 7548, 7554, 7560, 7566, 7572, 7578, 7584, 7590, 7596, 7602, 7608, 7614, 7620, 7626, 7632, 7638, 7644, 7650, 7656, 7662, 7668, 7674, 7680, 7686, 7692, 7698, 7704, 7710, 7716, 7722, 7728, 7734, 7740, 7746, 7752, 7758, 7764, 7770, 7776, 7782, 7788, 7794, 7800, 7806, 7812, 7818, 7824, 7830, 7836, 7842, 7848, 7854, 7860, 7866, 7872, 7878, 7884, 7890, 7896, 7902, 7908, 7914, 7920, 7926, 7932, 7938, 7944, 7950, 7956, 7962, 7968, 7974, 7980, 7986, 7992, 7998, 8004, 8010, 8016, 8022, 8028, 8034, 8040, 8046, 8052, 8058, 8064, 8070, 8076, 8082, 8088, 8094, 8100, 8106, 8112, 8118, 8124, 8130, 8136, 8142, 8148, 8154, 8160, 8166, 8172, 8178, 8184, 8190, 8196, 8202, 8208, 8214, 8220, 8226, 8232, 8238, 8244, 8250, 8256, 8262, 8268, 8274, 8280, 8286, 8292, 8298, 8304, 8310, 8316, 8322, 8328, 8334, 8340, 8346, 8352, 8358, 8364, 8370, 8376, 8382, 8388, 8394, 8400, 8406, 8412, 8418, 8424, 8430, 8436, 8442, 8448, 8454, 8460, 8466, 8472, 8478, 8484, 8490, 8496, 8502, 8508, 8514, 8520, 8526, 8532, 8538, 8544, 8550, 8556, 8562, 8568, 8574, 8580, 8586, 8592, 8598, 8604, 8610, 8616, 8622, 8628, 8634, 8640, 8646, 8652, 8658, 8664, 8670, 8676, 8682, 8688, 8694, 8700, 8706, 8712, 8718, 8724, 8730, 8736, 8742, 8748, 8754, 8760, 8766, 8772, 8778, 8784, 8790, 8796, 8802, 8808, 8814, 8820, 8826, 8832, 8838, 8844, 8850, 8856, 8862, 8868, 8874, 8880, 8886, 8892, 8898, 8904, 8910, 8916, 8922, 8928, 8934, 8940, 8946, 8952, 8958, 8964, 8970, 8976, 8982, 8988, 8994, 9000, 9006, 9012, 9018, 9024, 9030, 9036, 9042, 9048,

Tools—Coopers'—	
L. & J. White	Hay
Myers' Hay Tools	50%
Stowell's Hay Carriers	50%
Stowell's Hay Forks	50%
Stowell's Fork Pulleys	50%
Saw—	
Atkins' Cross Cut Saw Tools	40%
Simonds' Improved	35%
Simonds' Crescent	35%
Ship—	
L. & J. White	35%
Transom Lifters—	
See Lifters, Transom.	
Traps—Fly—	
Balloon, Globe or Acme	
doz. \$1.15 to 1.35; gro. \$11.50 to 12.00	
Harper, Chamion or Paragon	
doz. \$1.25 to 1.40; gro. \$13.00 to 13.50	
Game—	
Oneida Pattern	75¢ to 10¢ to 75¢ to 10¢
Newhouse	45¢ to 45¢ to 5¢
Hawley & Norton	65¢ to 65¢ to 5¢
Victor (Oneida Pattern)	75¢ to 75¢ to 5¢
O.C. Jump (Blake Pattern)	60¢ to 60¢ to 10¢
Mouse and Rat—	
Mouse, Wood, Choker, doz. holes	8¢ to 3¢
Mouse, Round or Square Wire	doz. 85¢ to 90¢
Marty French Rat and Mouse Traps	
(Genuine)	
No. 1, Rat, Each \$1.194; doz. \$12.00	
No. 3, Rat, doz. \$6.00; case of 50	
No. 3 1/2, Rat, doz. \$4.75; case of 72	
No. 4, Mouse, doz. \$3.50; case of 7	
No. 5, Mouse, doz. \$2.75; case of 130	
Schuyler's Rat Killer, No. 1, gr. \$30.00	
No. 2, gr. \$30.00; Mouse, No. 2, \$18.00	
J. M. Mast Mfg. Co.	Per doz. Rat
Blizzard	No. 12, \$3.00 No. 1, \$9.50
Old Nick	No. 30, 2.22 No. 2, 8.40
Joker	No. 6, 2.10 No. 2, 8.40
Imp'd Snap Shot, Mouse, per gro. 2	
hole, \$2.40	
Imp'd Snap Shot, Mouse, per gro. 4	
hole, \$4.20	
Trimmers Spoke—	
Bonney's Nos. 1 and 2	35¢ to 45¢
Trowels	
Diaston Brick and Pointing	30%
Diaston Plastering	35%
Diaston "Standard Brand" and Garden Trowels	35%
Kohler's Steel Garden Trowels, 5 in.	per doz. \$5.00
Kohler's Steel Garden Trowels, 6 in.	per doz. \$6.00
Never-Break Steel Garden Trowels	per doz. \$6.00
Rose Brick and Plastering	25¢ to 35¢
Woodrough & McParlin, Plastering	35%
Trucks, Warehouse, &c.—	
B. & L. Block Co.	
New York Pattern	50¢ to 10¢
Western Pattern	50¢ to 10¢
Handy Trucks	per doz. \$15.00
Grocery	per doz. \$15.00
Daisy Stove Trucks, Improved pattern	per doz. \$18.50
Model Stove Trucks	per doz. \$18.50
Tubs, Wash—	
Galvanized, per doz. \$5.00 5 5 6.25	
Galvanized Wash Tubs (S. & Co.)	
No. 1 2 3 10 20 30	
Per doz., net \$5.70 6.30 7.20 6.30 7.20 8.10	
Twine—Miscellaneous—	
Flax Twine	BC. B.
No. 9, 14 and 1/2 lb. Balls	25¢ to 40¢
No. 12, 14 and 1/2 lb. Balls	18¢ to 30¢
No. 18, 14 and 1/2 lb. Balls	16¢ to 18¢
No. 24, 14 and 1/2 lb. Balls	16¢ to 18¢
No. 36, 14 and 1/2 lb. Balls	15¢ to 17¢
Chalk Line, Cotton, 1/4 lb	
Balls	10¢ to 20¢

Cotton Mops, 6, 9, 12 and 15 lb. to doz.	10¢ to 12¢
Cotton Wrapping 5 Balls to lb.	16¢ to 25¢
according to quality	
American 2-Ply Hemp, 1/4 and 1/2 lb.	15¢ to 16¢
Balls	
American 3-Ply Hemp, 1-lb. Balls	15¢ to 16¢
India 2-Ply Hemp, 1/4 and 1/2 lb.	15¢ to 16¢
Balls (Spring Twine)	80¢
India 3-Ply Hemp, 1-lb. Balls	80¢
India 5-Ply Hemp, 1/4-lb. Balls	80¢
5, 5, 5 and 5-Ply Jute, 1/4-lb. Balls	80¢
Mason Line, Linen, 1/4-lb. Balls	10¢
No. 26 Mattress, 1/4 and 1/2 lb. Balls	37¢
Wool, 5 to 6 ply	5¢ to 6¢
Vises—	
Solid Box	50¢ to 10¢ to 60¢
Parallel—	
Athol Machine Co.	
Simpson's Adjustable	40%
Standard	40%
Amateur	35%
Bonney's	35%
Columbian Hdw. Co.	40%
Emmert Universal	
Pattern Makers' No. 1	\$15.00
Pattern Makers' No. 2	\$12.50
Machineist and Tool Makers' No. 4	\$12.50
Fisher & Norris Double Screw	15¢ to 10¢
Holland's	
Machinists	40¢ to 40¢ to 5¢
Keystone	65¢ to 70¢
Lewis Tool Co.	30¢ to 30¢
Merrill's	30%
Miller's Falls	60¢ to 10¢
Messy Vice Co.	
Climber	40%
Perfect	35%
Lightning Grip	30%
Parker's	
Victor	20¢ to 25¢
Regulars	20¢ to 25¢
Volcan's	40¢ to 45¢
Combination Pipe	55¢ to 60¢
Prentiss	30¢ to 25¢
Sargent's	40%
Smith & Hemenway Co.	
Machinists	40%
Jewellers	35%
Snediker's X. L.	35%
Stephens	35%
Saw Filers—	
Bonney's No. 1, \$13; No. 3, \$16	40%
Diaston's D 3 Clamp and Guide, per doz.	\$30
Perfect Saw Clamps, per doz.	35%
Reading	60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3	45¢ to 50¢
Wood Workers—	
Massey Vice Co.	
Lightning Grip	15%
Perfect	15%
Wyman & Gordon's Quick Action, 6 in., \$6.00; 9 in., \$7.00; 14 in., \$8.00.	
Miscellaneous—	
Signal & Keeler Combination Pipe	
Vise	
Holland's Combination Pipe	60¢ to 65¢
Machinist's Quick Action Pipe	60%
Parker's Combination Pipe	
87 Series	60%
187 Series	60¢ to 5¢
No. 870	40%
Wads—Price P. R. M.	
B. E., 11 up	60%
B. E., 9 and 10	70%
B. E., 8	80%
B. E., 7	80%
P. E., 11 up	1.00
P. E., 9 and 10	1.25
P. E., 8	1.50
P. E., 7	1.50
Ely's B. E., 11 and larger	\$1.70 to 1.75
Ely's P. E., 12 to 20	\$3.00 to 3.50

Ware Hollow—	
Cast Iron, Hollow—	
Stove Hollow Ware:	
Enameled	55¢ to 10¢ to 60%
Ground	60¢ to 10¢ to 65%
Plain or Unground	65¢ to 10¢ to 70%
Country Hollowware per 100 lbs.	\$3.50
White Enameled Ware:	
Martin Kettles	70%
Covered Ware:	
Tinned and Turned	40%
Enameled	50%
See also Pots and	
Enameled—	
Agate Nickel Steel Ware	50¢ to 20
Agate Nickel Steel Ware, Specials	60¢ to 15%
Iron Clad Ware	70¢ to 10%
Lava, Enameled	40¢ to 10%
Never Break Enameled	50%
Tea Kettles—	
Galvanized Tea Kettles:	
Each	6 7 8 9
1 lb. 1 1/2 2 3 4 5 6 7 8 9	
Every Spiders & Griddles	65¢ to 25%
Every Kettles	90%
Red Star, family size, stationary	50¢ to 50¢ to 10%
Never Break Spiders and Griddles	65¢ to 5%
Never Break Kettles	60%
Solid Steel Spiders & Griddles	65¢ to 5%
Solid Steel Kettles	60%
Warmers, Foot—	
Pike Mfg. Co. Soapstone	40¢ to 40¢ to 10%
Washboards—	
Solid Zinc:	per doz.
Crescent, family size, bent frame	\$3.00
Red Star, family size, stationary	protector
Double Zinc Surface:	
Saginaw Globe, family size, station-	
ary protector	\$2.65
Cable Cross, family size, stationary	protector
Single Zinc Surface:	
Saginaw Globe, family size, open	
back	\$3.00
Nickel Plate Surface:	
No. 1001 Nickel Plate, Single Surface	\$3.00
Washers—	
Leather, Axle—	
Solid	90¢ to 10¢ to 80¢ to 10¢
Patent	90¢ to 90¢ to 10¢
Coil:	1 1/2 1 3/4 1 1/2 1 1/2
1 1/2 1 3/4 1 1/2 1 1/2	
Size bolt	1/2 3/4 1 1/2 1 1/2 1 1/2
Washers	\$5.10 4.20 2.50 2.70 2.50
In lots less than one keg add 1/4¢ per	
lb. 5¢ boxes add 1/4¢ to list.	
Cast Washers	
Over 1/2 inch barrel lots per lb. 1/4¢ to 2¢	
Washers, Hog—	
Improved Dewey	per doz. \$13.00
Wedges—	
Oil Finish	lb. 2.35 to 2.40¢
Weights—	
Litching—	
Covert Mfg. Co.	40¢ to 2¢
Covert's Saddlery Works	60¢ to 10%
Sash—	
Per ton, f.o.b. factory:	
Eastern District	\$25.00
Western, Central and Southern	
Districts market unsettled,	
prices ranging from \$21.00 to \$26.00	
Wheels, Well—	
8-in., \$1.60 to 1.80; 10-in., \$2.00 to 2.25;	
12-in., \$2.15 to 2.35; 14-in., \$3.00 to 4.25	
Wire and Wire Goods—	
Bright and Annealed:	
6 to 9	75¢ to 75¢ to 10%
10 to 18	75¢ to 75¢ to 10%
19 to 26	75¢ to 10¢ to 80¢ to 5%

27 to 36	75¢ to 10¢ to 75¢ to 80¢ to 5%
Galvanized:	
6 to 9	70¢ to 5¢ to 70¢ to 10%
10 to 18	70¢ to 5¢ to 70¢ to 10%
19 to 26	75¢ to 75¢ to 5%
27 to 36	70¢ to 70¢ to 5%
Coppered:	
6 to 9	70¢ to 5¢ to 70¢ to 10%
10 to 18	70¢ to 10¢ to 70¢ to 10%
19 to 26	75¢ to 10¢ to 75%
27 to 36	70¢ to 70¢ to 5%
Tinned:	
6 to 9	75¢ to 10¢ to 75%
10 to 18	70¢ to 10¢ to 70¢ to 10%
19 to 26	65¢ to 10¢ to 10%
27 to 36	60¢ to 50¢ to 10%
Annealed, Steel and Tinned, on	
Spools	70¢ to 70¢
Brass & Copper on Spools	60¢ to 60¢
Brass list Feb. 26, '96	50%
Copper list Feb. 26, '96	15%
Cast Steel Wire	50%
Wire Clothes Line, see Line	
Wire Picture Cord, see Cord	
Bright Wire Goods—	
List June 21, 1903	90¢ to 10¢ to 10%
Wire Cloth and Netting—	
Galvanized Wire Netting	80¢ to 10¢ to 10¢ to 5%
Painted Screen Cloth, per 100 ft. \$1.25	
Standard Galv. Hardware Grade:	
Nos. 2, 3 1/2 and 5 Mesh, sq. ft.	3c
Nos. 4 and 5 Mesh, sq. ft.	3 1/2c
No. 6 Mesh, sq. ft.	3 1/2c
No. 8 Mesh, sq. ft.	4c
Wire Barb—See Trade Report.	
Wrenches—	
Agricultural	80¢ to 5¢ to 80¢ to 10¢ to 5%
Baxter Pat'n S Wrenches	70¢ to 5¢ to 70¢ to 10%
Drop Forged S.	45¢ to 45¢ to 5%
Acme	30¢ to 10%
Aligator	70%
Aligator Pattern	70%
Bull Dog	70%
Bemis & Call's:	
Adjustable S.	35¢ to 5%
Adjustable S Pipe	40%
Briggs' Pattern	30¢ to 10%
Combination Black	40¢ to 5%
Combination Bright	40%
Merrick's Pattern	50%
No. 3 Pipe, Bright	55%
Barman's	
Coe's Genuine Knife Hdl.	40¢ to 10¢ to 5%
Coe's Genuine Steel Hdl.	40¢ to 10¢ to 5%
Coe's Genuine Key Model	40¢ to 10¢ to 5%
Coe's Mechanics	40¢ to 10¢ to 5%
Donohue's Engineer	40¢ to 10%
Dudley Combination	50¢ to 10%
Dudley Pipe	50¢ to 10%
Dudley Adjustable Pipe	40¢ to 10%
Eagle	50¢ to 10%
Elgin Wrenches	40%
Elgin Monkey Wrench Pipe Jaws	35¢ to 4%
Gem Pocket	30%
Hercules	40%
W. & B. Machinist	70%
Case lots	50¢ to 5%
Less than case lots	50%
Improved Pipe (W. & B.)	40%
Solid Handles, P. S. & W.	50¢ to 50¢ to 5%
Stiles	45%
Triumph	60¢ to 10%
Vulcan Chain	50%
Fruit Jar—	
T & B Fruit Jar Wrenches	per gro. \$9.00
Triumph Fruit Can Wrenches	per gro. \$9.00
Triumph Fruit Jar Holders	per gro. \$15.00
Wrought Goods—	
Staples, Hooks, &c., list March 17	
Yokes Neck	
Covert Saddlery Works, Trimmed	70%
Covert Saddlery Works, Neck Yoke	70%
Centers	70%
Yokes, Ox, and Ox Bows	
Fert Madison's Farmers & Freighters	list net
Zinc—	
Sheet	per 100 lbs. \$6.35 to 6.60

PAINTS, OILS AND COLORS.

White Lead, Zinc, &c.	
Lead, English white, in Oil	95¢ to 95%
Lead, American White, in Oil:	
Lots of 500 lb. or over	65%
Lots less than 500 lb.	7%
In Barrels	6%
Lead, White, in oil, 25 lb tin	
balls, add to keg price	3%
Lead, White, in oil, 12 1/2 lb tin	
balls, add to keg price	1%
Lead, White, in oil, 5 lb tin	
sorted tins, add to keg price	1%
Lead, American, Terms: For lots 12 tons and over 1/4¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice; for lots of less than 500 lbs. net.	
Lead, White, Dry in bbls.	6%
Zinc, American, dry	45¢ to 47%
Zinc, Paris, Red Seal, dry	8%
Zinc, Paris, Green Seal, dry	9%
Zinc, Antwerp, Red Seal, dry	6%
Zinc, Antwerp, Green Seal, dry	8%
Zinc, V. M. French, in Poppy Oil, Green Seal:	
Lots of 1 ton and over	12 1/2%
Lots of less than 1 ton	12 1/4% to 12 1/2%
Zinc, V. M. French, in Poppy Oil, Red Seal:	
Lots of 1 ton and over	10% to 11 1/4%
Lots of less than 1 ton	11% to 11 1/4%
Discounts—V. M. French Zinc—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1%; 25 bbls., 2%; 50 bbls., 4%.	
Dry Colors.	
Black, Carbon	5¢ to 10¢
Black, Drop, Eng.	4¢ to 6¢
Black, Drop, Eng.	5¢ to 15¢
Black, Ivory	16¢ to 20¢
Lamp, Com.	45¢ to 60¢
Blue, Celestial	4¢ to 6¢
Blue, Chinese	29¢ to 32¢
Blue, Prussian	37¢ to 40¢
Blue, Ultramarine	44¢ to 15%
Brown, Spanish	32¢ to 1%
Carmine, No. 40	\$3.75 to 4.00
Green, Chrome, ordinary	3¢ to 6%

Green, Chrome, pure	17¢ to 25%
Lead, Red, bbls. 1/2 bbls. and kegs:	
Lots 500 lb. or over	6%
Lots less than 500 lb.	7%
Litharge, bbls. 1/2 bbls. and kegs:	
Lots 500 lb. or over	6%
Lots less than 500 lb.	7%
Ocher, American	25¢ to 50¢ to 10¢ to 0%
Orcher, American Golden	2¢ to 3%
Orcher, French	1 1/2¢ to 2 1/2%
Orcher, Foreign Golden	3¢ to 4%
Orange Mineral, English	9¢ to 11%
Orange Mineral, French	10¢ to 11 1/4%
Orange Mineral, German	6% to 9%
Orange Mineral, American	8¢ to 8 1/4%
Red, Indian, English	4% to 4 1/4%
Red, Indian, American	3¢ to 3 1/4%
Red, Turkey, English	4¢ to 6%
Red, Tuscan, English	7¢ to 10%
Red, Venetian, Amer.	\$100 to \$10.50 to 10%
Red Venetian, English	\$100 to 1.35 to 17%
Sienna, Italian, Burnt and Powdered	3¢ to 6%
Sienna, Ital., Raw, Powd.	3¢ to 6%
Sienna, American, Raw	1 1/2¢ to 3%
Sienna, American, Burnt and Powdered	1 1/2¢ to 2%
Talc, French	1¢ to 1 1/2%
Talc, American	75¢ to 1.25%
Terra Alba, French	95¢ to 1.00%
Terra Alba, English	95¢ to 1.00%
Terra Alba, American No. 1	75¢ to 80%
Terra Alba, American No. 2	50¢ to 60%
Umber, Turkey, Raw & Powd.	2 1/2¢ to 3%
Umber, Bnt. Amer.	1 1/2¢ to 2%
Umber, Raw, Amer.	1¢ to 2%
Yellow, Chrome	11¢ to 14%
Vermilion, American Lead	10¢ to 25%
Vermilion, Quicksilver, bulk	70%
Vermilion, Quicksilver, bags	71%
Vermilion, English, Import.	40¢ to 45%
Vermilion, Chinese	\$6.00 to \$1.00
Colors in Oil.	
Black, Lampblack	12¢ to 14%
Blue, Chinese	36¢ to 46%
Blue, Prussian	32¢ to 36%
Blue, Ultramarine	13¢ to 16%
Brown, Vandyke	11¢ to 14%

Green, Chrome	10¢ to 1
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